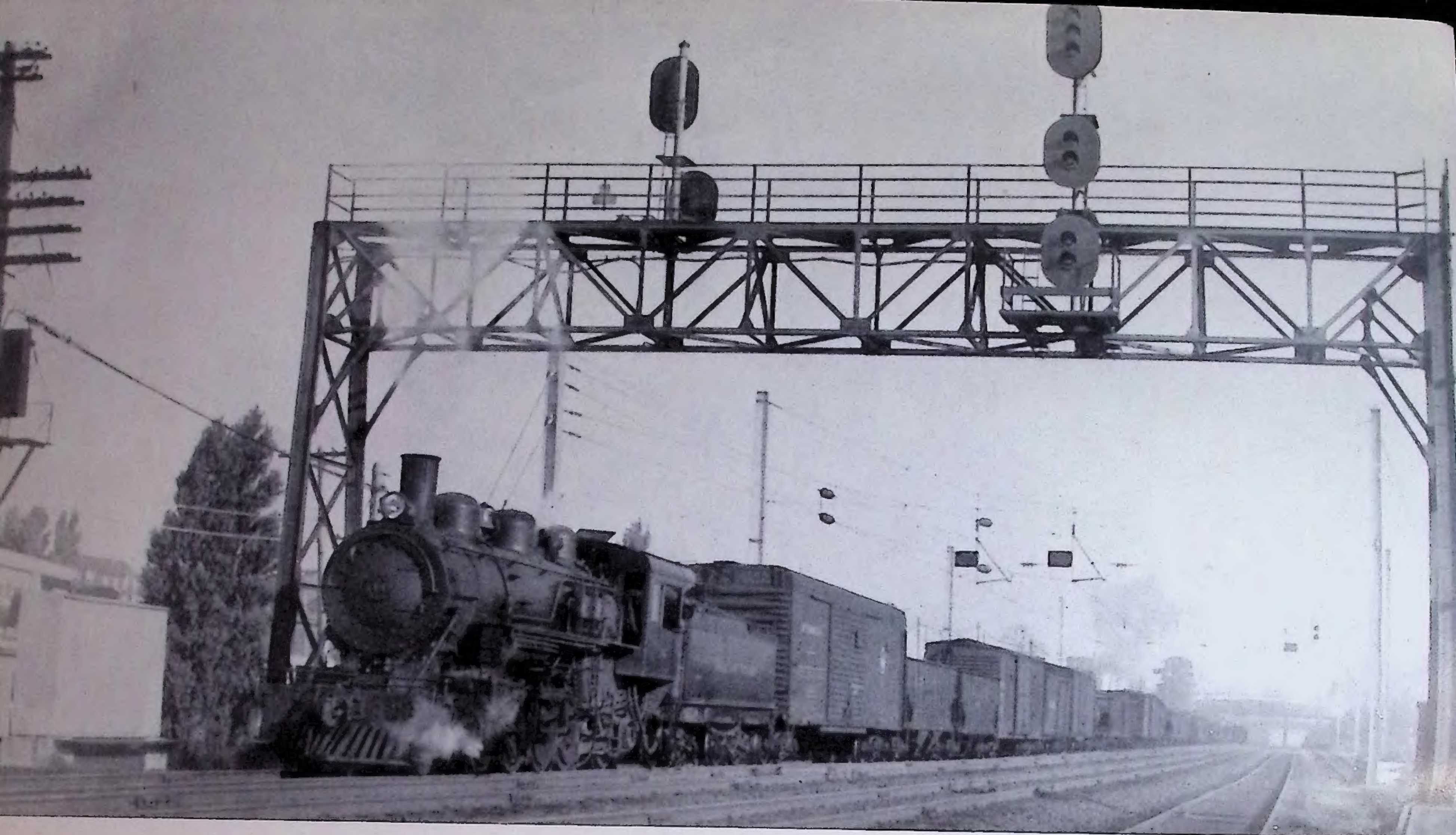
Trains

25¢

for JULY



M. B. Cooke, 9 Grant Ave., Jersey City, N. J.

Raritan River Railroad.

This 12.3-mile-long freight service and switching line runs between New Brunswick and South Amboy, N. J. No. 14, a 2-8-0, is shown pulling a typical string over rails of the connecting New York & Long Branch Railroad.

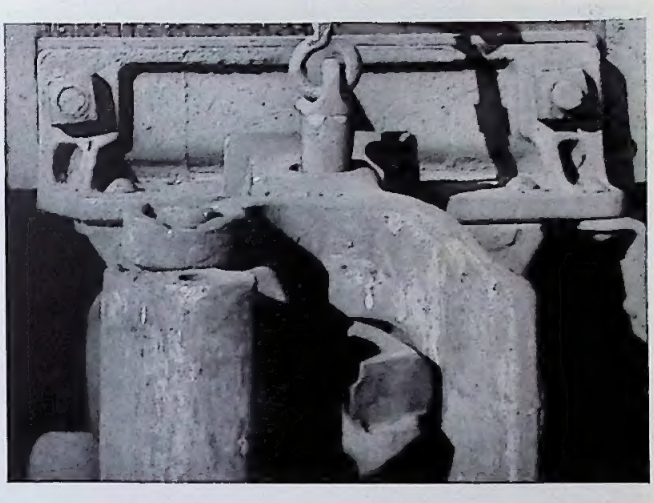
Waybills

"Back the train up!" cried an excited lady passenger to the brakeman on a Southern Pacific train recently. "I forgot to turn my hot water heater off." The train was proceeding at a pretty good clip so the brakeman compromised by phoning at the next stop to one of the passenger's neighbors and arranging to have the heater turned off.

Old-time steam railroaders are usually quite vitriolic in their dislike of electric railroads, often placing them in the same classification as trucks and buses. Younger men can't understand this, for to them electric railroads are simply railroads run by electric power, acting usually as useful feeders to the steam roads, and sometimes as Class 1 roads in their own right. No wonder the younger men can't understand. The enmity goes back 20 or 30 years to the time when the interurban lines were the trucks and buses of their day, when they ran alongside highways on the closest to free rights of way that rails have ever enjoyed, when they charged lower fares and paid lower wages, and when they were a multitude of small, flimsily organized local companies. Place yourself back in that era and it will be easier to see why the mechanical similarity of flanged wheels on steel rails was overlooked because of the business differences.

Is your file of TRAINS complete from the start? First issue was dated November, 1940, and there has been one every month since then. We can furnish all at 25 cents each.

A. C. K.



Trains

Editors: A. C. Kalmbach, Linn H. Westcott, Willard V. Anderson

Vol. 1 July, 1941 No. 9

Features

MILWAUKEE ELECTRIFICATION ---- 4
By Edwin H. Bowers.

VARNISH VIGNETTES ---- 12
By Lucius Beebe.

LOSS—$5500 A DAY ---- 14
By A. C. Kalmbach.

ONE-MAN RAILROAD IN RHODE ISLAND ---- 22
Illustrations by Martin Sheridan.

SHAY LOCOMOTIVES ---- 28
By Linn H. Westcott.

ENGINE "999" ---- 35
By Gil Reid.

BLUE RIDGE RAILWAY ---- 36
By Ellsworth Knapp.

PENNSYLVANIA'S "THE JEFFERSONIAN" ---- 42
A sequel to "The Trailblazer."

HIAWATHAS AT NEW LISBON ---- 43
By John F. Boose.

also Letters, News, and Miscellany.

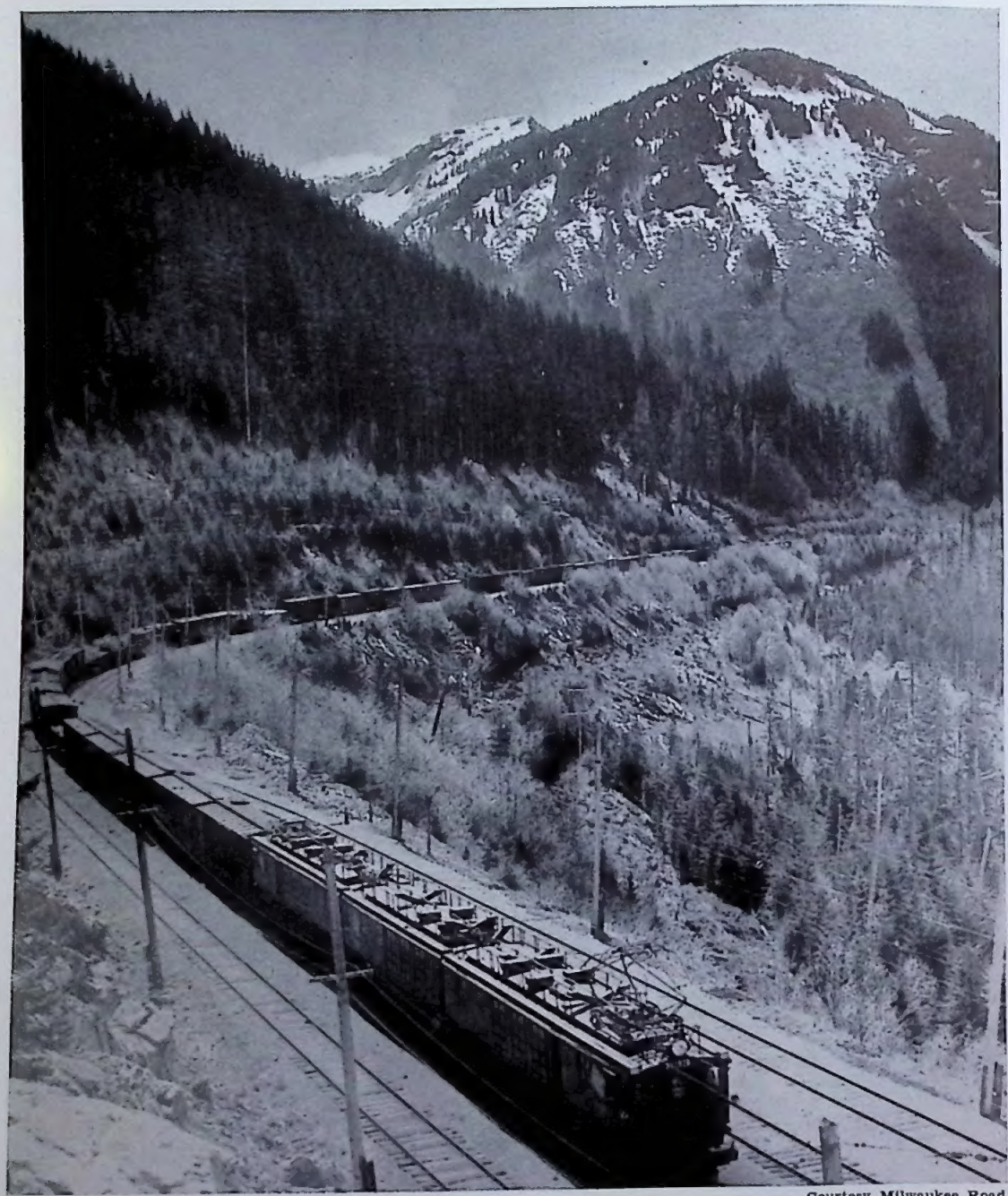
Cover photo by Martin Sheridan, courtesy People and Places (see page 22); masthead photo by Linn H. Westcott.

TRAINS (title registered as a trade mark in the United States Patent Office) is published monthly by Kalmbach Publishing Co., 1568 W. Pierce St., Milwaukee, Wis., U. S. A.

Entered as second-class matter Oct. 11, 1940, at the post office at Milwaukee, Wis.

Subscription Rates: Per year in U. S., Central and South America, $2.50
Single copies 25 cents. In other countries, $3.00 per year; single copies 30 cents.

The first issue of TRAINS was for November, 1940. All back copies available at 25 cents each.



Courtesy Milwaukee Road.

Northwest passage from the Orient.

The romance of world trade rides with these freight cars, loaded with goods from ships at Seattle and Tacoma and with products of our Pacific Northwest. The Chicago, Milwaukee, St. Paul & Pacific is one of three great railroad routes across the northern states to the Pacific. It is electrically operated for 656 miles across four mountain ranges. A three-unit freight locomotive, as above, with a similar helper at the middle of the train, can lift a 5000-ton trainload over the passes and then ease it gently down grade with regenerative braking—not a hot brake shoe on the train!

Milwaukee Electrification

★ CMStP&P electric locomotives help each other climb the Rockies and the Cascades.

By Edwin H. Bowers.

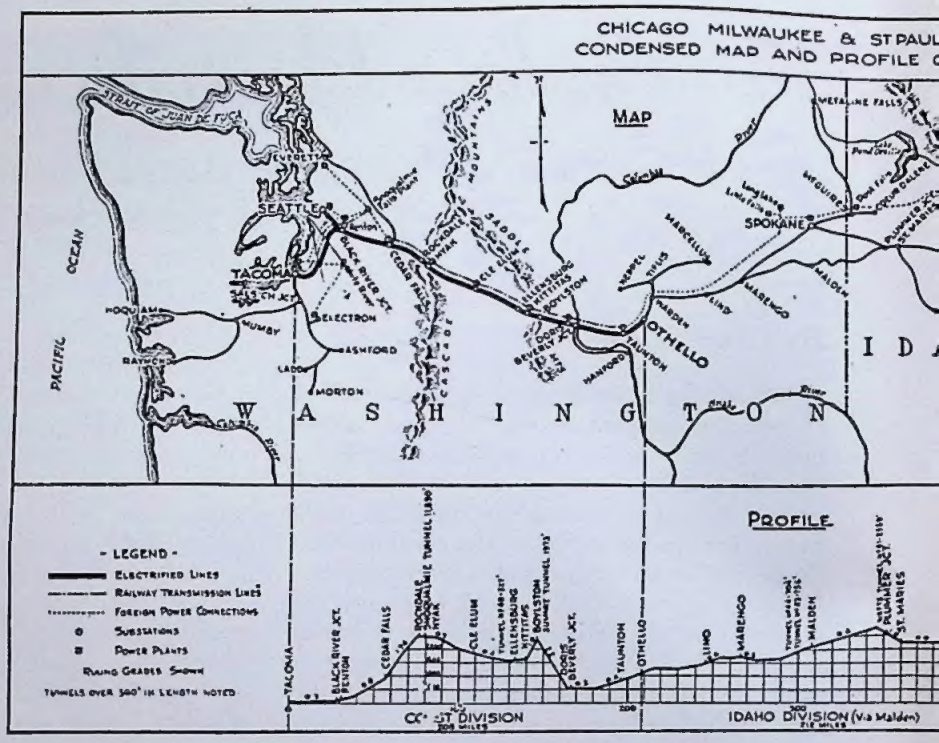
THE sun had just popped up from behind the Cascades when she left Seattle, and now it's nearly 8:30 a. m. as Milwaukee Road time freight No. 264 pauses in Cedar Falls, Wash., during switching and addition of a helper for the big climb to Snoqualmie Pass Tunnel. One big three-unit General Electric freight motor is at the head end, another coupled in the middle of the train where it can pull its half of the tonnage. Business is good! The Eastern lumber market improved measurably last year, and the diversion of ships to the more lucrative wartime trade has loaded thousands of tons additional onto the transcontinental railroads. Yet time freight 264 will be through to Chicago on schedule.

The train engineer on the front locomotive pulls out his throttle, watches the ammeter. Nothing happens for noticeable seconds as the motors soak up the current, and then the huge machine starts to move, very slowly, evenly, and gradually. Slack clanks out. The helper engineer watches the slack in the train immediately ahead of him and when the pull gets back to a few cars from his locomotive he inches out his throttle. Thus his engine merely takes up the second half of the load at just the right time, instead of giving a push to the front portion of the load. The train must be worked up to full speed control position within half an hour or so not only to avoid damage to the equipment, especially the control resistance grids, but also to avoid the waste of power by heat dissipated from the resistances. Ahead lies the 20-mile 1.74 per cent climb up Snoqualmie River Valley to the crest of the Cascades, beautifully green in their late Spring finery.

Talk about the Northwest passage—this is it! In normal peacetime the Milwaukee hauls out of Seattle raw silk, wood, oil, and tea from China and Japan; cotton from China, porcelain from Japan, wool from Manchuria, raw skins from Siberia, and hemp and cocoanut oil from the Philippine Islands. Foreign trade or no foreign trade, from our own Northwest states various forms of finished lumber, posts, poles and piling, wood pulp and paper, fish and agricultural products, livestock, wool, grain, crude oil, manganese, zinc, copper and copper products all go East over the steel-paved trade route. The lumber business is a big factor in traffic volume, and, according to the Northwest Lumberman's Association, the increase in railroad-shipped lumber in the last year has amounted to about 12 per cent of all the lumber produced in the area.

To the Milwaukee Road this sudden increase in business afforded another opportunity to test the efficiency of its electrical operation under emergency conditions. The load on train No. 264 was increased on the big hill over the Cascades between Cedar Falls and Hyak from 3500 to 5000 tons. At the same time both east and westbound schedules were speeded, cutting a full day off the running time between Chicago and the Pacific Coast. But, because an electric locomotive will assume an overload when its speed is reduced due to adverse gradients, and will develop over twice its normal power output during acceleration, a given tonnage can be moved over the rails at much better schedule speed than can be achieved by steam or other constant horsepower locomotives. To handle the tremendously increased tonnage over the Cascade mountains, it was necessary only to change from a two- to a three-unit motor for the helper on the hill between Cedar Falls and Hyak, and to make a similar increase on the hill between Avery, Ida., and East Portal in the Bitter Roots.

In many ways the electrification on the Milwaukee Road is unique in the history of the application of electricity to the hauling of main line trains. The Milwaukee Road was the first heavy traffic road to turn to electricity solely for the purpose of reducing



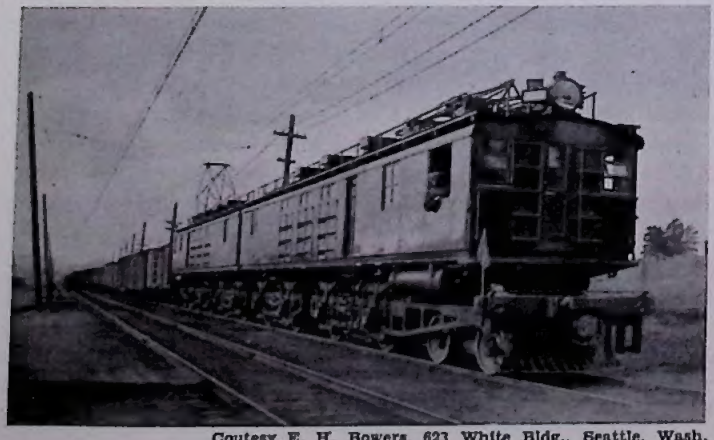
The line.

Two stretches of tough trackage are electrified with the comparatively level Idaho division steam operated between. The magnitude of this electrification is only realized when one looks at the mileage figures. The map covers a territory equal to that from Chicago to New York!

operating costs and for expediting traffic over its lines (on other projects, electrification was undertaken as a necessity because of tunnel and terminal operations), and the first steam road to operate electric locomotives over more than one division.

It was A. J. Earling, who was president of the Milwaukee Road at the time that it was being extended to the Pacific Coast in 1906-09, who first saw the wonderful possibilities in the abundance of cheap water power in the mountains of the West, and long before electrification was begun he had made provisions for power sites. However, when electrification was finally decided upon, it was determined through negotiations with the Montana Power Company and the Washington Power Company that it would be more feasible to utilize the existing facilities of their systems, and power contracts were signed with those companies.

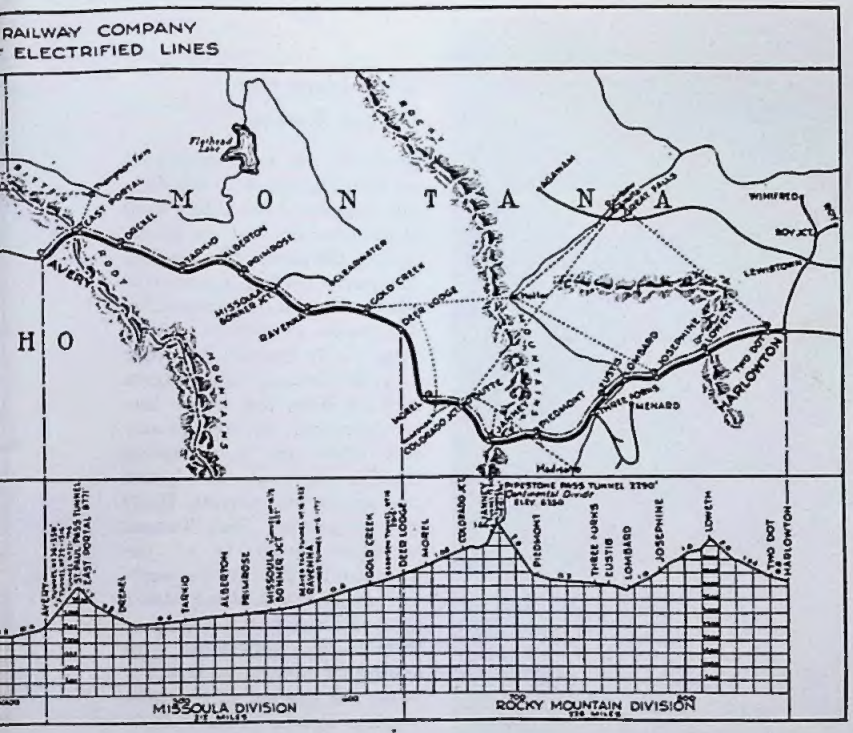
With Reinier Beeuwkes, electrical engineer, in charge, preliminary surveys were made, and specifications drawn up that were so accurate in every detail that the changeover was made with little or no interruption of regular schedules. The same engineers who had handled the steam locomotives were instructed by the manufacturer's experts in handling the new



Coutesy E. H. Bowers, 623 White Bldg., Seattle, Wash.

Freight engine.

General Electric built 42 locomotives like this for the original Milwaukee electrification, 30 geared for freight and 12 for passenger. All are now used in freight service, and most of them have been doubled up into three-unit locomotives with maximum tractive effort of 172,750 pounds.

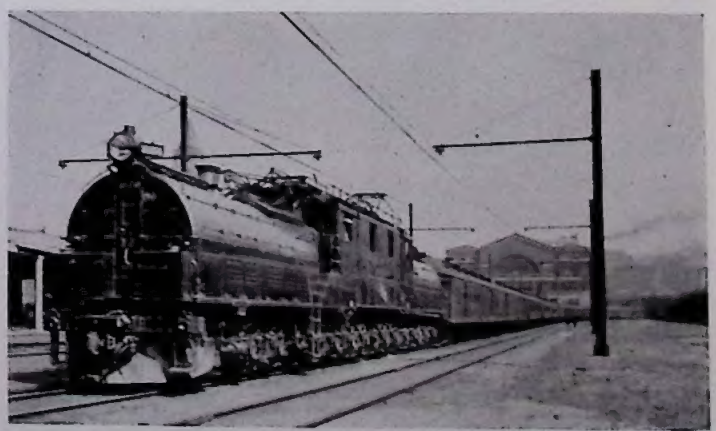


electrical equipment on trains in regular service.

The initial electrification of the Milwaukee Road included four steam engine divisions extending from Harlowton, Mont., to Avery, Ida., a distance of 438 miles. This distance is approximately equal to that between New York and Buffalo, and is more than the electrified route mileage of any trunk line now operating electric locomotives. Electric service was started during December, 1915, and was gradually extended over the entire Rocky Mountain and Missoula divisions, steam engines being entirely superseded about a year later. At this time there were 42 main line freight and passenger locomotives in operation and two switching locomotives, these machines replacing 112 steam locomotives of various types used just prior to the beginning of electrification.

In traversing the mountain districts, the tracks of the Milwaukee Road include many long grades and short radius curves. In crossing the four mountain ranges, Belts, Rockies, Bitter Roots, and Cascades (to list them from East to West), there are several grades of 1 per cent and more, the most difficult of which is the 19-mile 2.2 per cent westbound grade between Beverly, Wash., and Boylston, Wash., and the longest of which is the 49-mile 1 per cent grade ascending the west slope of the Belt Mountains. The maximum curvature is 10 degrees, and there are many sections where this curvature is reached. There are also numerous tunnels in the electrified zone, the longest being Snoqualmie Tunnel, over 2¼ miles in length, piercing the ridge of the Cascade Mountains. In Winter the heavy snows in the mountains make the problem of train movements most difficult, and Winter temperatures as low as 40 degrees below zero in the Bitter Roots caused serious delays under steam operation through engine failure or inability to make steam.

Outstanding feature of the power system is the unusually high D. C. voltage used. The



Courtesy General Electric Co.

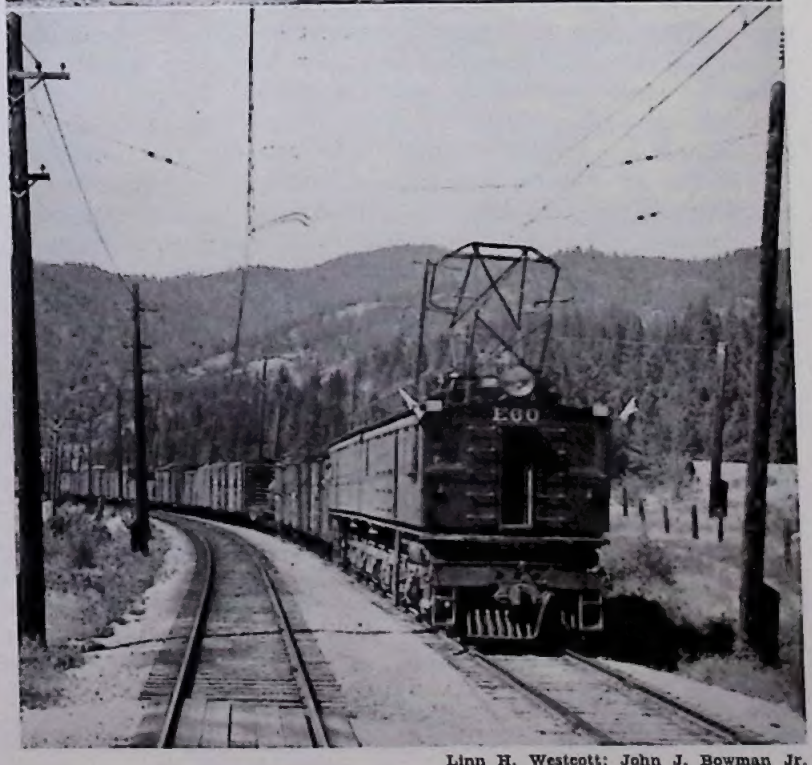
Passenger engine.

The bi-polar gearless (motor armatures mounted right on drive axles) passenger locomotives used on the Coast Division can take 13 heavy Pullmans up the Cascades at 30 miles per hour. Train is the *Olympian* in Seattle's Union Station, which is also used by the Union Pacific Railroad.

Climbing the Bitter Roots.

Thrill of the eastbound ride on the *Olympian* is the daylight ascent of the Bitter Root Mountains in eastern Idaho. Before the summit is reached the train, behind a powerful Westinghouse locomotive, negotiates a 10-mile detour into a side canyon in order to gain altitude. Passengers looking from the upper line (background of top photo) can often see a following freight train on the lower line across the canyon. Half-mile Pipestone Pass Tunnel (middle photo) is at the Continental Divide, its western approach looking down upon the railroad winding up from Butte. Substation with operator's homes, at Kittitas, Wash., is typical of the Milwaukee Road's power supply facilities (lowest photo). Alternating current is purchased, then converted to 3000 volts D. C. by the road.

Milwaukee Road; Linn H. Westcott; E. A. Bowers collection.



Moving freight with juice.

All Milwaukee Road electric locomotives formerly bore cumbersome five-digit numbers, but when all steam locomotives were renumbered a few years ago electrics were moved down into a two-digit series with the prefix E. The front end portrait is of a two-unit freighter with a westbound scheduled train, waiting for a meet. The lower picture was taken from the open observation car of the *Olympian* near Cobden, Mont., as the eastbound passenger train ran around a freight. Fifty miles back both trains crossed the summit of the Bitter Root Mountains through 8771-foot St. Paul Pass Tunnel. For 200 miles they will climb to the Continental Divide, first along the smoothly undulating valleys of Clark Fork, Columbia River, through Missoula and Deer Lodge and then up, up into Butte, and finally over.

Linn H. Westcott; John J. Bowman Jr.

power is delivered from the power company's line to the Milwaukee Road substations, where it is converted from 100,000 volts, three-phase, 60-cycle A. C., to 3000 volts D. C., and delivered to the specially designed twin trolley catenary overhead. There are 14 substations on the Missoula and Rocky Mountain divisions (now consolidated), and eight on the Coast Division.

Current is taken from the trolley wires by a pantograph collector, two of which are mounted on each locomotive (except the switchers, which have one). This collector is the double pan type, with a working range of from 17 to 26 feet above the rail. The contact elements are of the same material as the trolley wire so that the current passes from copper to copper. There are control cabs at both ends of the locomotives, and the pantographs at either end are raised or lowered by air pressure as the engineer changes ends. The rear pantograph is normally used so that an accident to it is less likely to also damage the other pantograph.

The main line locomotives furnished for the initial 440 miles of electrification in Montana were of uniform design, except that 12 were equipped with passenger gears and with boilers and oil and water storage tanks for providing steam heat for use in passenger train service, and 30 were fitted with freight gears. To replace the original passenger engines, and to handle passenger trains on the Cascade electrification, 15 new passenger locomotives were purchased.

The main line freight locomotives are constructed in three units, permanently coupled together, the two end units being duplicates, each capable of independent operation. It is possible to separate the units and use them singly for light freight service, construction trains, and snow plows, or to add units and increase power indefinitely, or up to the point of maximum draw bar strain.

The specifications of the various types of power are as follows:

Class of Locomotive	EF-1	EF-3	EP-2	EP-3
Service	Frt.	Frt.	Pass.	Pass.
Make	G.E. Co.	G.E. Co.	G.E. Co.	W.E. & M. Co.
Wheel arrangement	444444	44444444	248842	462264
Drivers	16-52"	24-52"	24-44"	12-68"
Total weight	576,000	816,000	521,200	620,000
Weight on drivers	451,000	691,000	457,800	420,000
Rating—Hourly:				
Tractive effort	84,500	126,750	48,500	66,000
Horse power	3,440	5,760	3,517	4,200
Max. tractive effort	112,750	172,750	114,450	105,000
Miles per hour	40	40	65	65

Perhaps the most outstanding single feature of the electric locomotives is the solution by the use of regenerative braking of the difficult braking problem on the long sustained grades encountered in crossing the mountain ranges. To handle either the heavy and varied freight or high speed passenger trains on the mountain grades with the usual air brakes requires great skill. The entire energy of the descending train must be dissipated by the friction of the brake shoe on the wheels. This energy approximates 3500 kilowatts, or 4700 horsepower for a 2500-ton train running 17 miles per hour down a 2 per cent grade. This explains why brake shoes frequently become red hot, and serious damage is done. The use of retainers causes further delay, and it is necessary for the trainmen to "decorate," by no means a pleasant job, particularly during cold and stormy weather. All these difficulties are eliminated by regeneration.

With regenerative braking, the motors become generators which convert the energy of the descending train into electricity, thereby restricting the train to a safe speed and at the same time returning electric power to the trolley for the use of other trains. The strain on draw bars and couplings is minimized, since the entire train is bunched behind the locomotive. The electric braking mechanism automatically controls the speed by regulating the amount of energy fed back to the line. This smooth descent is in marked contrast to the periodical slowing down and speeding up of a train controlled by air brakes.

The usual speed of the electrically handled freight train is 15 miles per hour ascending, and 17 miles per hour descending the maximum grade, but half that speed can easily be maintained with series connections of the motors should conditions require it.

In case there are no other trains between the substations to absorb the power generated by a descending train, this power passes through the substation machinery, is converted from D. C. to A. C. current, and fed into the distribution system connecting all substations. The power company's line is extensive and the load is of such a diversified character that any surplus power returned can readily be absorbed by the system.

The advantages of regenerative braking are: elimination of difficulties incident to the use of air brakes in heavy freight trains when descending mountain grades; elimination of

stops to cool wheels; elimination of shoe and wheel wear with resultant reduction in maintenance; maximum safety in operation assured by a duplicate braking system relieving the air brakes; the entire absence of grinding of the brakes, which is especially disagreeable on a heavy passenger train; increased comfort to passengers; and reduced wear and tear on freight equipment, owing to uniform speed on grades. Helper engines work clear over each summit, being used to help hold the train on the descending grade. They are then in position for service in the opposite direction.

Air brakes are used for ordinary braking purposes, and to bring the train to a complete stop. The air brake equipment is practically the same as that on steam locomotives, except that motor-driven air compressors are used to furnish compressed air. One of these air compressor systems is located on each end unit, and has a capacity of 150 cubic feet of free air per minute. Besides the air brakes, compressed air is used for signals, whistles, bell ringers, sanders, pantographs, part of the control equipment, and, in the passenger locomotives, for the oil-fired steam boilers.

With an eye to the future, the Milwaukee Road is continuing to improve its electrical equipment now in service, and new types are tested as they are developed by the manufacturers. Diesel-electric power has been given a trial on the mountain divisions, but, without regenerative braking power, it was found to be not as satisfactory as the present equipment. The only Diesel-electrics now in service on the Milwaukee Road are 600- and 1000-horsepower switchers.

The success of the electrification on the Milwaukee Road was forecast by the late C. A. Goodnow while vice-president in charge of electrification for the railroad when, after the first Winter of electrical operation, he said, "Our electrification has been tested by the worst Winter in the memory of modern railroaders. There were times when every steam locomotive on the Rocky Mountain District was frozen, but the electric locomotives went right on rolling along."

Winter time in the Cascades.

The big climb in Washington is on the eastbound ascent of the Cascades. The railroad rises from sea level to nearly 2500 feet in 45 miles (from Black River Junction) before threading Snoqualmie Tunnel. Here is the *Olympian* in Winter hauled by a gearless bi-polar locomotive built by General Electric.

Courtesy General Electric Co.

Varnish Vignettes

★ Passing thoughts, railroads and travel.

By Lucius Beebe.

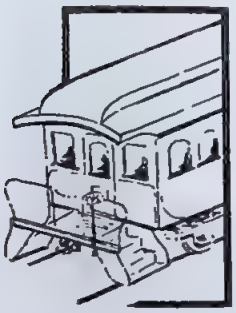
THE dining car steward on the old *Florida Special* en route to Palm Beach reminding my father that it was his fortieth wedding anniversary. . . . He'd been a waiter in the Vendome in Boston at the time. . . . Riding 100 miles an hour headend on one of the Santa Fe's 7200 class out of La Junta on the "speedway" and being black and blue for a fortnight as a result. . . . The wonderful fresh mountain trout, direct from the icy streams of the Colorado Rockies,

served on the diners of the Denver & Rio Grande Western's *Scenic Limited* while passing over the top of the world. . . . The restaurant cars on the *Twentieth Century Limited* which, by switching the table linen and lighting to a subdued orchid, become night clubs after 10 o'clock in the evening. . . . The service of 5 o'clock tea, *a l'Anglais*, aboard the first class coaches and Pullmans on the Lackawanna.

The cannonball stoves on the Bangor & Aroostook coaches of my Down East childhood. . . . The thrice-welcome hods of beer aboard the air cooled Pullman which served as press car at the New York World's Fair showing of "Railroads on Parade." . . . The whistle of the nightly New Britain freight, a romantic souvenir of undergraduate days at New Haven. . . . The chicken stew with magnificent dumplings, served by a singing darky waiter on the Wabash *Banner Blue* while passing through the Illinois cornfields one Summer afternoon. . . . My father, who fell dead at 80 while running to make a connection in the Pennsylvania Station in New York. . . . The inscribed white overalls, cap and drivers' gloves presented me by the St. Louis Terminal Employees' Association while participating at the dedication of the new inter-locking tower there. . . . My delight at being able to train a camera on the Alton-Burlington's *General Pershing Zephyr* being shamefully hauled out of Kansas City on the St. Louis run by a shabby Burlington light Pacific. . . . Miscalculating the speed of the *Morning Hiawatha* while taking action photographs at Lake Forest, Ill., and losing a good new hat in the powerful draft created by its passing.

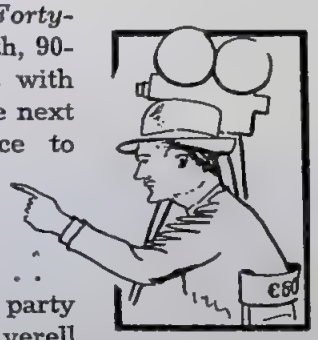
Drinking champagne with the tailcoated governors of four states aboard a Colorado & Southern narrow gauge private car at Blackhawk, Colo., during the Central City Drama Festival. . . . Breaking my nose when I fell out of my berth on the Chesapeake & Ohio's *Sportsman* when it pulled a drawbar in the middle of the night near Manassas. . . . The splendid paint jobs of the Frisco's power, with their burnished brass, blue sheen of boiler lagging and red and gold number markers. . . . The electric clocks, private room radios and other travel luxuries aboard the Burlington's *Denver Zephyr*. . . . Standing with President Williamson of the Central on the rear platform of the old *Century* as we overtook an eastbound hotshot slamming out of Elkhart, Ind., and the old gentleman saying: "Look at those high cars roll; finest sight in the world!" . . . The courtesy of an old-time conductor on the Southern's *Queen and Crescent* somewhere in the wilds of Mississippi, who waited five minutes to spot the diner on a siding so I could finish a mess of shrimps Creole in comfort.

The open-platform coaches and 40-year-old 4-4-0's and 2-6-0's on the Western Division of the Boston & Maine which might come straight from a railroading scene of the late eighties or nineties. . . . Waiting for the *Chief*, double-headed and working steam with Johnson bars notched all the way forward, below Summit in the Cajon and knowing I had the railroad picture of a lifetime cold turkey.



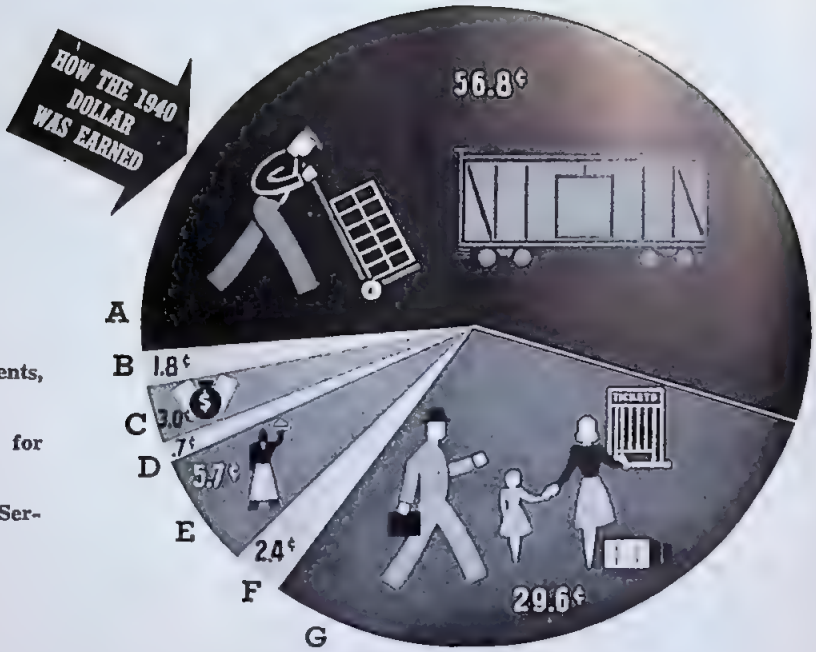
The good old days when there were as many as 20 private cars at a time spotted on the house tracks of the now vanished Royal Ponciana Hotel at Palm Beach. . . . Even the trestle across Lake Worth has gone now. . . . The elaborate club cars on the Mopac's *Sunshine Special*, decorated in mission style with a bar, soda fountain, reading room, observation lounge, shower bath and everything but a swimming plunge. . . . Encountering once aboard the *Denver Zephyr* a dining car steward who had once been my Uncle Marc's butler 20 years before. . . . Passing through Tobar on the Western Pacific just across the southern end of the Great Salt Lake, now just a sign to commemorate a town named in the seventies for its principal signpost reading "To Bar." . . . The handsomest of all club cars aboard the *Broadway*, designed and decorated by Raymond Loewy with historic murals instead of windows and a color theme of the Pennsy's classic tuscan red. . . . Riding in mortal terror in the cab of the *General Bowker* during the filming of *Union Pacific* at Iron Springs, Utah, when the hogger in the big Union Pacific freight job that was hauling the train, complete with wooden coaches of Civil War vintage, forgot the Bowker wasn't really good for 50 miles an hour and the wind tore the wooden cab off around our ears. . . . There was no train line to signal him with and we rode 10 miles down the Lund spur clutching at the backhead gear and regretting past sins. . . . The remarkable railroad knowledge of Cecil B. DeMille, director of the film, who could detect technical flaws in his sets invisible even to President William Jeffers, who watched part of the filming. . . . The view of Donner Lake under a frozen February moon seen from the window of a drawing room of the *City of San Francisco* through the passing snowsheds.

The sightly airflow lines of the green and gold 4-8-2's that power the Grand Trunk's *Maple Leaf* out of Chicago. . . . The *Orange Blossom* in three sections of 18 cars each romping through the palmetto groves of Florida during the height of the Southern season. . . . The tinted windows of the club and restaurant cars of the Texas & Pacific used on the desert runs between El Paso and Fort Worth. . . . The dining car on the *Forty-niner*, a full length, 90-foot arrangement with the kitchen in the next car, reputed once to have been the private conveyance of the President of Mexico. . . . The all-night party aboard W. Averell Harriman's 18-car private train over the Illinois Central between Chicago and Omaha for the preview of *Union Pacific*. . . . The thrill implicit in the name "Rio Grande" whenever encountered on equipment in obscure yards and terminals. . . . The most sightly of all Diesel units, the colorful and speedy seven-car *Rocky Mountain Rocket* on the Rock Island. . . . The state dinner arranged by the steward aboard the *City of Los Angeles* for Lady Suzanne Wilkins, complete from caviar to souffle and including grouse, Mexican quail and vintage wines. . . . The first breath-taking sight of the Espee's *Daylight*, all orange and black and red, streaking over the ochre hills of California.



. . . Vignettes.

1940



A. From Freight Carried.

B. Railway Express.

C. Income From Rents, Investments, Etc.

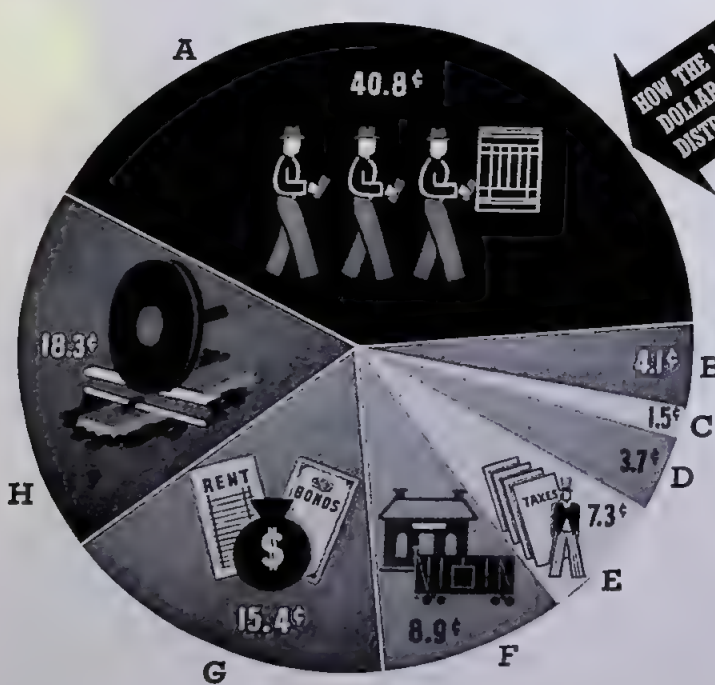
D. Rent From Other Companies for Equipment and Facilities.

E. Other Transportation, Dining Service, Etc.

F. For Carrying Mail.

G. From Passengers Carried.

The money comes and goes



1940

A. Total Wages to Employees.

B. Fuel Costs.

C. Damage to Freight, Personal Injuries and Insurance.

D. Depreciation and Retirements.

E. Taxes: Local, State and Federal.

F. Rent for Equipment and Facilities.

G. Interest on Indebtedness, Rent for Leased Properties, Etc.

H. Material and Supplies.

Every railroad cuts two pies.

Here are the two pies of income and outgo for the New Haven. The upper chart shows just where the average dollar came from in 1940, mostly from freight but with a passenger share much larger than the U. S. average. The small slices for dining service, mail and express, investments, and rents will add up into a sum of millions which the New Haven would find it mighty hard to do without. After garnishing thoroughly with steam, smoke, and wheel clicks the pie is recut and served, the largest slice for employees, next largest for materials and supplies, and so on down to the 1.5-cent slice for claims and insurance.

Loss—$5500 a Day

★ Railroad companies often lose money but must maintain their service; New Haven case story.

By A. C. Kalmbach.

THE old shoemaker had a formula. "If there's more in the till at night than there was in the morning, I made money." Any accountant can tell you there's plenty wrong with that simple formula, but essentially it's the stuff of which business is made.

A railroad is a business, a fact we are all too likely to overlook. The 13-car all-Pullman luxury flyer with its sleek, snorting 4-8-4 may make your heart skip a beat, but if it can't take in more money than it costs it may not be there next year.

The railroad is a peculiarly fascinating business in many a way, but it's still a business. Fortunately the fascination holds over even into an examination of the comings and goings of the cash that pays the bills, so let's take apart a typical railroad treasury and see what makes it tick. We'll see shadows, in dollars and cents, of motive power and high speed main line, of extra fare limiteds and coach passengers, of solid coal drag freights and fast merchandise trains. All leave their mark on the treasurer's books and the annual report is but a summing-up of all the railroad operation for the year in an accurate perspective.

As a strictly business proposition a railroad is more interesting than the run-of-the-mill enterprise, because it is the most meddled-

C. Parker, 45 Warren St., Newton Centre, Mass.

Gone from the New Haven scene.

The New Haven has trimmed its suburban service in the Boston area during recent years as other means of transportation, particularly the private automobile, have cut deeply into the revenues of this once-lucrative business. Ten years ago the now-scarce 1500 series 4-4-0 locomotives, which once pulled New York-Boston trains on the Air Line, could be seen at the head of suburban trains, as in this view of No. 1586 with a train of open-platform coaches at Hazelwood, about eight miles out of Boston on the main line to Providence. Hazelwood is no longer used as a regular stop, but looks the same today. Suburban commutation service is the cheapest of all railroad passenger service. Based on highly concentrated movements, rates are figured on a monthly or multiple-trip basis at only a small fraction of the mile rate per single trip. Some suburban housewives buy 25-ride bearer tickets, make pin money "renting" them at reduced rates per single trip to other suburbanites who make only a limited number of rides.

FREIGHT HAULED

GROSS FREIGHT REVENUE

with of all businesses. The government meddles, and in fact the kicks of private business men at government regulation are only echos of what they wished on the railroads years and years ago. Not only does the government meddle, but labor meddles, the customers meddle, and plain, ordinary citizens who don't even use the railroads are continually suggesting them as guinea pigs for this or that crack-brained economic experiment.

Let's look over the New York, New Haven & Hartford 1940 statement and see where the money came from and what the New Haven was able to accomplish with it in spite of all the meddling.

The money, nearly 89 million dollars of it, came in greatest part from carrying freight, although the New Haven has an unusually high proportion of passenger revenue. In fact, only two United States railroads, the Pennsylvania and the New York Central, have greater passenger revenue. Somewhat more than 50 million dollars came from freight, 33 million from carrying passengers. The balance consisted of million or two million driblets of revenue from such items as mail, express, dining service, baggage, rents for terminal facilities, and income from investments.

The railroad in its annual statement compares these income items with previous years, and a noticeable increase of freight traffic during 1940 is reflected. This means heavy trains pounding over the 1853 miles of New Haven line, thousands of cars shuffling back and forth in Cedar Hill and other New Haven yards, higher crew wages and fuel bills, new equipment on order and in service to meet the increasing rush of rearmanent. This means, too, a lower net loss for 1940 (the New Haven is in receivership and doesn't break even). The deficit for the year is a piddling $2,004,-175 compared with $3,560,469 in 1935.

Just what did become of all the 89 million dollars to create a net loss? As in 'most any business, payroll ate up the largest share of revenue. Out of the New Haven's 89 million, 37 million went to employees. Materials and supplies took the next biggest slice, 16 million. Rent for equipment and facilities was 8 million, reminding one of the many joint terminal properties used by all railroads the country over, as well as the many dollars paid to the Pullman Company and private freight car

PRINCIPAL COMMODITIES

Hauled by the New Haven, 1940.

PRODUCTS OF AGRICULTURE	2,232,339 TONS	Grain Cotton Products Fruits and Vegetables
ANIMALS AND PRODUCTS	684,385 TONS	Fresh Meats Poultry Dairy Products Wool, Hides, and Leather
PRODUCTS OF MINES	6,300,354 TONS	Anthracite Coal Bituminous Coal Coke
PRODUCTS OF FORESTS	880,521 TONS	Lumber Shingles and Lath Logs and Poles Crating
MANUFACTURES AND MISCELLANEOUS	9,869,279 TONS	Iron and Steel, Machinery and Scrap Copper, Lead, Zinc and Aluminum Cement, Brick, Tile and Artificial Stone Oil—Fuel Purposes and Road Oil
L. C. L. FREIGHT	1,370,031 TONS	

1939--19,937,241 Tons.

TOTAL 21,336,909 TONS

companies for equipment rentals. Taxes took nearly 7 million, a whopping 7.7 per cent slice. This was $315.40 per employee. Add to that amount paid by each employee in direct and indirect taxation and the scope of the tax load on each of us as an individual can be visualized.

Depreciation and retirements took more than 3 million. This isn't a fund set aside for replacements, but a write-off of equipment which is wearing out and which is better charged off through the period of its life rather than all at once when it is purchased. The depreciation item brings up all the new equipment being put into service now, perhaps to cause large depreciation charges for many years to come, years which may not be as productive of revenue as the early 1940's.

Even the financial statement shows that the New Haven is partially electrified. It's not just fuel costs that eat up $3,365,032, but fuel and electricity. The importance of the claim agent in the railroad setup is shown by an item of $1,396,704 for damage to freight, personal injuries, and insurance. A remaining 14 million dollars of expense was for interest on debt and rent for leased properties.

The splitup of freight revenue gives us a good picture of almost any railroad. Look at the Chesapeake & Ohio freight record and through its figures see solid trains of coal. Look at the New Haven statement and see industrial New England, with manufactures and miscellaneous making up by far the largest share of tonnage, and an even larger share of revenue, owing to higher rates on this more valuable traffic. The preponderance of high rate traffic is also reflected in the average freight charge of 1.7 cents per ton-mile. The average American railroad charge, weighted down by tons and tons of coal and ore, is slightly less than 1 cent per ton-mile.

The 21 million tons of freight carried by the New Haven during 1940 represents an average of 63,013 tons carried every day by an average of 86 through freight trains operated daily and 134 local freight trains operated six days per week. The tonnage handled was carried an average distance of 135 miles and each train hauled an average of 54.5 loaded and empty cars with an average gross load of 1997 tons at an average speed of 14.6 miles per hour. The low average train load shows clearly the reason for the New Haven's higher ton-mile costs as against the coal and ore roads, which handle trains

PASSENGERS CARRIED

PASSENGER REVENUE

PASSENGER REVENUE

Is 37 per cent of the total.

	Passengers Carried	Passenger Revenue	Average per Passenger
PULLMAN	1,024,692	$ 5,333,003	$5.19
COACH	14,819,763	15,197,371	1.03
EXCURSION	1,177,964	1,091,908	.93
COMMUTATION	19,691,493	4,210,039	.21
MISCELLANEOUS		510,169	
TOTAL	36,713,912	$26,342,490	

MAIL	$2,154,284
EXPRESS	1,556,405
DINING SERVICE	1,252,891
ALL OTHER	1,980,319

TOTAL PASSENGER REVENUE

$33,286,389

1939 -- $34,233,222

that consistently add up to 10,000 tons or thereabouts.

Where does the traffic come from? The New Haven gets slightly more loads from connections than from industries along the line. In 1940 an average of 1370 cars a day were loaded on line and 1661 loaded cars were received from other lines. The marine department floated an average of 1721 cars a day in New York Harbor, which gives a mighty clear picture of the strategic importance of New York interchange in the New England railroad picture.

Decreased Rates Bring Decreased Revenue.

How about that 29.6 cents of every New Haven dollar that came from passengers? There lies the heart of the railroad business for the typical traveler. Freight trains may pay the bills, but passenger trains have the glamor. Well, the accounting shows that New Haven passenger revenue was down 3.8 per cent in 1940, reflecting the decrease in basic coach fare to 2 cents a mile as ordered by the I. C. C. This obviously brings up the rates for the various classes of passenger traffic, and any mention of rates is sure to start an argument among the nation's railroad passenger men.

Some say fares are too high, some say they are too low, and now and then a railroad passenger man thinks the present setup is about right. The high-fare advocates think that reduced fares haven't stimulated traffic enough to make up for the decreased revenue per passenger. Their opponents contend that lower fares have been a life saver for the railroads. And as in any argument, each side can and will produce statistics to support its position.

Such a difference of opinion is inevitable in a business as widespread as are the railroads, with each railroad subject to its own special conditions. Some roads depend on Pullman travel, some on coach travel, and with some the passenger business is nothing but an unmitigated headache. Pullman passengers in 1940 accounted for about 20 per cent of New Haven passenger revenue and yet were less than 3 per cent of the total passengers carried. This indicates the importance of first class passengers to the New Haven and shows why the reduction in coach fares could raise such cain with the total revenue. A greater spread in rate between first class and coach encourages more border-line travelers to go coach, and thereby hangs the much discussed opposition of some roads to reduced coach rates. The roads which oppose such lower rates usually have high Pullman travel, while the roads which want lower coach fares usually rely on coach travel or on potential coach business which they feel lower fares will bring them, attracting travelers who heretofore have used buses or private automobiles because of their seemingly lower rates per mile.

Back before the World War passenger fares were generally based on about 2 or 2½ cents a mile. Then under government operation a standard rate of 3 cents a mile was instituted, the first country-wide standard fare base. Two years later, in connection with government-enacted wage boosts, a 20 per cent increase was authorized, and thus resulted the 3.6-cent rate which was standard until the early thirties. Fare reductions to as low as 1½ cents a mile, but varying with sections of the country, were then made and changed from time to time in experiments to find the optimum fare level.

Outside of these changes in basic passenger fares have been endless special fares. For instance, the New Haven operating statement for 1940 reflects not only the higher rates charged for riding in Pullman cars, but the especially low rates for commutation riders. For daily commuters, special low monthly fares and various forms of multiple-trip tickets at reduced fares have been available for many years. Mileage rates on commutation tickets decrease as distance increases. For example, the present rate for the 60-ride adult monthly commutation ticket averages 1⅞ cents per mile for distances of 11 miles or less. It decreases to about ⅝ cent per mile for 41 miles or less.

Monthly student tickets average 9/10 cent per mile for 11 miles or less and decrease to ½ cent per mile for more than 11 miles but less than 36 miles.

Experimentation in recent years has not stopped at the charges for passenger service. The New Haven annual report recalls the greatest timetable improvement in the road's history, that of April, 1940. Many trains were added and schedules speeded up. Among these improvements is a daytime hourly service which was put on between Boston and New York.

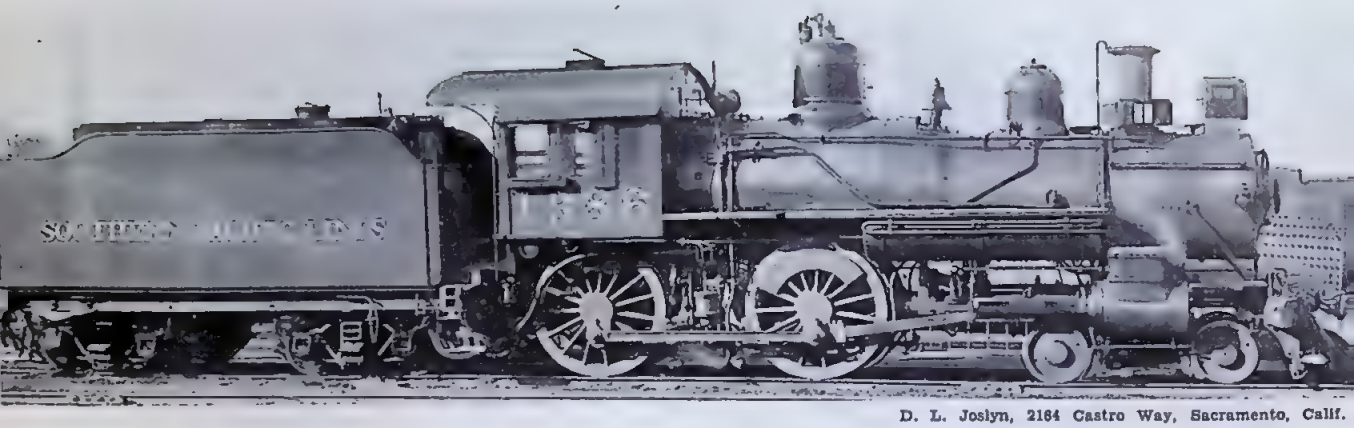
Courtesy New York, New Haven & Hartford.

"I see here that the New Haven carried 21,336,909 tons of freight in 1940—not counting us."

Reducing some of the dry statistics to train rides and train riders, we find that the New Haven received $4.44 from the average parlor car passenger for carrying him 148 miles, $6.15 from the average sleeping car passenger for carrying him 205 miles, $1 from the average coach passenger for carrying him 50 miles, $1 from the average excursion passenger for carrying him 100 miles, and 20 cents from the average suburban passenger for 20 miles.

And so the New Haven accountants polish off the profit and loss statement and the balance sheet for 1940. As the last figures are ground out they materialize into an average day on New England's big railroad system. Here's that average day:

The New Haven handles 3,031 cars of freight.
63,013 tons of freight are carried 135 miles.
220 freight and 182 passenger trains are operated.
The railroad rolls off 4,000,000 passenger-miles.
The system averages 190,000 passenger car miles.
Passenger trains run an average of 25,000 miles.
63,000 commuters ride to work.
53,000 passengers are carried to and from New York City.
33,000 passengers are carried to and from Boston.
41,000 passengers ride in coaches, not including commuters.
The road carries 2800 passengers in parlor and sleeping cars.
1900 meals are served in diners and 660 in grill cars.

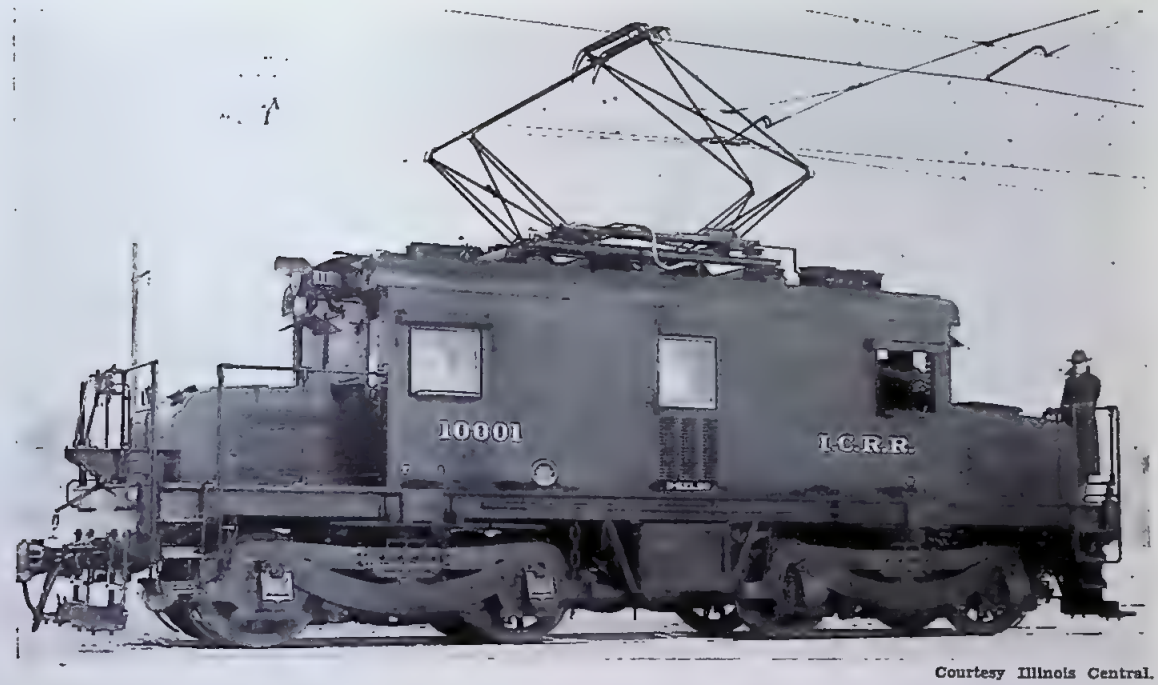


D. L. Joslyn, 2164 Castro Way, Sacramento, Calif.

Southern Pacific old-timers at Sacramento.

Here are four locomotives characteristic of early Southern Pacific passenger haulers. No. 1386 is a locomotive that was rebuilt in the Sacramento shops some time ago from a design that looked something like 219, 220, and 221 at the bottom of the page. These 4-4-0's are very scarce on the Southern Pacific Lines, since the railroad has been considerably modernized from head to foot. Characteristic features of Southern Pacific motive power of the present day are the cabs, which look definitely Southern Pacific, the frequent use of Vanderbilt tenders (not shown in these pictures), and the use of train number markers such as the one shown on either side of the stack of 1386. These latter carry the number of the train so that towermen and operators along the way can report trains without error. Photographer D. L. Joslyn has a large collection of railphotos. There was an interesting article about him in the November, 1939, *Popular Photography*.

D. L. Joslyn.



Courtesy Illinois Central.

Electricity powers trains at Chicago.

Some years ago there was quite a stir in Chicago to get all railroads leading into the city to eliminate smoke-puffing coal burners. The progressive Illinois Central made the most effort toward this plan and actually electrified many miles of track in the suburban and terminal area. The plan is not being carried out by any of the railroads at present. IC through trains are still worked by steam, but electricity is used for switching purposes and also for the Illinois Central's frequent suburban passenger service.

Coutesy General Electric Co.

One-Man Railroad in

Illustrations by Martin Sheridan.

Courtesy People and Places, *De Soto-Plymouth dealers' magazine.*

WHEN you take one of the more than thirty daily trains on the New Haven between New York and Boston you may not be aware of the many branch lines which diverge from the main every few miles. Most of these are operated by the New Haven, but in southern Rhode Island there are two very short railroads which are complete in themselves: the Narragansett Pier Railroad, from Kingston to tidewater (of which a story should be told in these pages some day), and the Wood River Branch Railroad.

This 5.6-mile line starts at Wood River Junction, a point not even listed on New Haven timetables. The track winds north and west to the Wood River, which it follows to the village of Hope Valley. But like even the biggest of railroads, much of the interest is centered around the people who run it.

The WRB is owned and presidented by one Roy Rawlings, known well to Rhode Islanders as an ex-Speaker in the state's House of Representatives. Rawlings, in normal life, is a grain merchant with his warehouses at Hope Valley. Up until 1937 the New Haven was operating the branch line to Hope Valley, but the overhead and maintenance, what with the government regulations and all, made the branch unprofitable for the company.

Rather than see Hope Valley and his grain business stranded and at the mercy of the highways, Rawlings dickered with the New Haven and purchased the entire branch line for $301—lock, plenty of stock, and barrel. Overnight the pike became of age, a railroad in its own right.

The Wood River line was built way back in 1872, and in the old days carried a goodly passenger and mail service every day. Today there are four trips a week made with a gasoline-burning locomotive numbered 1872 in honor of the birth of the pike. The loco is rented from the New Haven. The train starts from Hope Valley about 10:30 a. m. on Monday, Wednesday, Thursday and Friday, but only if a phone call to the other end of the line makes certain that there will be cars to trundle back; economy is the life line of a stubby little railroad serving only a few communities.

Engineer Schofield has many jobs.

Reat Schofield, featured on the front cover this month, is an employee at Rawlings' grain business in Hope Valley, but at train time Monday, Wednesday, Thursday and Friday, he may be seen watering the Plymouth-motored locomotive from a cow pond, loading l. c. l. freight into the all-purpose caboose, or turning switches at ends of sidings.

Rhode Island

★ 5.6-mile Wood River Branch Railroad is the link between Hope Valley and the New Haven.

The engineer is one of the employees of the grain business and he is also yardmaster for the .7 mile of side tracks, as well as track walker, entire train crew, and agent. A run on the line may mean shooing cows, filling the radiator with water, driving home a loose spike, or even stopping to pick huckleberries.

Does the line pay? *No!*

A year's business may move perhaps some 10,000 tons of freight at a loss of $1500 (earlier losses have been nearly $3000), but the thankful citizens along the line have exempted it from taxation to do their part in retaining the facility.

Passengers? Yes. That is, by appointment. Rawlings owns a little six-passenger speeder that makes a trip on almost any occasion for visitors. It is called the *Presidential Special,* just five feet wide and equipped with three old coach seats. The *Special* is not a speeder in every sense, however, for it has no power of its own; but it has a brake!

When the line was purchased the buy included one car, a caboose. This all-purpose job has a door in its side and comes in very handy for l. c. l. shipments. Rawlings often boasts that old gag that his line is one of the shortest but just as wide as the biggest.

Most of the railroad mileage in Rhode Island is New York, New Haven & Hartford operated. The main line from New York to Boston runs diagonally through the state from Westerly at the southwest to Providence and Pawtucket at the northeast. Other New Haven lines radiate from Providence. At one time there was a thriving trolley business to Warren, Bristol and Fall River, but only a part of this line is now in operation.

President Rawlings.

Ex-member of the government of Rhode Island (Speaker of the House), in the grain business at Hope Valley, R. I. Purchased the Wood River Branch Railroad for $301 to save Hope Valley from depending upon the pavements alone for transportation. The railroad operates at a loss much greater than its purchase price (almost $3000 in 1938). Losses were reduced in following years but it will be interesting to see how Rawlings will make the line show a profit. Although there have been a number of abandonments of New England branch lines, most of them have been short connecting links that do not isolate important centers.

Motive power for passengers.

This is Charley. He runs the one-cylinder speeder which pushes the three-seat observation car (no extra fare). The speeder also serves well as a maintenance train, wrecker, and track inspection car on the five-mile Wood River Branch Railroad.

Wood River rolling stock has great variety.

Engine 1872 is numbered to remind the interested of the date when the WRB was built. To make the gas-powered hauler look more appropriate a sand dome, bell, and stack have been added. The engine is owned by the NYNH&H and leased to the WRB. Behind the locomotive is the combination freight car and caboose, the only

Martin Sheridan, courtesy *People and Places.*

large piece of rolling stock that came with the railroad. The passenger car is an open-air affair that must be pushed by the speeder (bottom left and bottom right respectively). Engineer Schofield has a postman's holiday, for he's riding in the left rear seat in the day coach. The old-timer above is a coach-baggage combination, relic of days gone by. It bears the words "Wood River Branch Railroad—Smoker" in much chipped paint, and stands ingloriously beside the main line near the Hope Valley terminal.

Montana's Melting Miles

Montana Summers mean a warm sun in a soft blue sky quilted with white fluffy clouds. In the western distance are always seen mountains capped with melting snow, the sources of the Columbia and great Missouri basin. Three transcontinental railroads have made their way through the dust bowl and over the mountains, heading for the great Northwest: Great Northern to the north, Milwaukee Road and the axial Northern Pacific entangling each other in the middle and south. Here is an eastbound time freight in the Yellowstone River Valley near Mission, Mont. Beyond the grassy river flats rise the dry mesas, the beds of great prehistoric streams; beyond these, the Crazy Mountains, still covered with snow. The locomotive is No. 5104, a 4-6-6-4 articulated.

Betty Nixon usually accompanied her husband, R. V. Nixon, on his many camera trips, and was probably with him when some of the previously published Nixon photos in TRAINS were taken. The two went to see the last passenger run on the little NP branch to Wallace, Ida., a few weeks ago. This was the same branch featured in the article "Off the Beaten Track" in TRAINS for February. Unfortunately it was Betty's last trip too; she was taken to a hospital where she died a week later from appendectomy complications. This is one of the last photographs Betty ever took.

R. V. Nixon, 319 N. 3rd St., Livingston, Mont.

Thirteen coaches of draftees.

This double-headed Northern Pacific train, Extra 2180 West, is hauling troops near Elton, Mont. Besides the coaches there are three baggage cars for the young men's belongings; the locomotives are small Pacifics, since most heavy power is at a premium for the railroad's regularly scheduled trains, more important from an operating standpoint. Army expenditures on transportation have brought many an old dusty car back to daily duty; in some cases the railroads have had to borrow cars for the movements. These Northern Pacific trains are better than average, for the road's troop hauling equipment is relatively modern.

Betty Nixon.

Shay Locomotives

★ Lima's best seller is an out-puller too! Shays pull extra heavy loads on sharp curves, steep grades.

By Linn H. Westcott.

THE Lima Locomotive Works might never have gained its reputation for Superpower Locomotives had it not been for its development of the extraordinary Shay geared locomotive, an iron mule with Herculean energy. It all started back in Lima, O., in 1879, when railroad expansion was hitting an upward dash on the graphs. The Lima Machine Works was in the circular saw business, sending machinery to buzz in the forests of Michigan and the West. It made a number of accessory items for its timber cutting customers too, and one day it created a locomotive tailored for the industry.

It was a queer looking contraption, perhaps like some of the first locomotives that ever wore down a wooden rail. There was a simple two-member-frame supported on two four-wheel trucks, like a short flat car. In the center was a small upright boiler, fuel box on one end, water tank on the other. The cab was no more than a roof erected over the boiler with a spark catcher poking out the top. On the right side of the boiler two upright cylinders (7″ x 7″) drove cranks on a longitudinal shaft at the side of the car, about a foot above the rails. The four axles were geared to this shaft by bevel gears and the shaft was made flexible with universal couplings and slip sleeves. No. 1 had much the appearance of No. 10 (the fifth Shay), pictured on page 30.

It didn't take loggers long to find that this new locomotive would outdo a dozen mules, then the standard streamliner of the industry. Lima received orders for more locomotives, some geared, an equal number of direct drive jobs. Ephraim Shay, lumberman inventor of the engine, was kept busy at the Lima plant improving the machine and inventing other devices for the industry.

Why was the new geared idea so successful? First, the gearing permitted the engine to make as many as 18 cylinder strokes to one

The "Pacific Coast" Shay, 1929.

This is the last word in hill-climbing bulldogs. From left to right are: Water tank over rear driven truck (bevel gears transform torque of longitudinal shaft to more powerful axle torque), oil tank over second geared truck, cab, three-cylinder engine operating main shaft by cranks, air pump (notice sleeve and universal joints on shaft below), boiler with smokebox end over leading geared truck. The frame is a deep fishbelly girder; boiler is to left of center line to offset the weight of machinery on right.

Courtesy Lima Locomotive Works.

The World's Fair Shay, 1893.

Lima's 450th locomotive ready to go to the older Chicago World's Fair. The engine was a two-truck job with three 11″ x 12″ cylinders, 52″ truck wheelbase, 27′-4″ total wheelbase, 39 feet total length, 42:19 gear ratio, 80,000 pounds weight, loaded with fuel and water. This Shay model featured patent steam brakes.

revolution of the wheels, smooth power since an ordinary two-cylinder job makes only four. The engine had lots of pull, for all wheels were drivers utilizing the entire weight of the machine for traction, and distributing the forces evenly when lightweight track had to be protected. The short length and swivel trucks would negotiate very sharp curves (it would be nothing to manage the curves on an old New England interurban line). With cylinders, valve gear, and all moving parts located along one side it was very easy to make repairs and adjustments too.

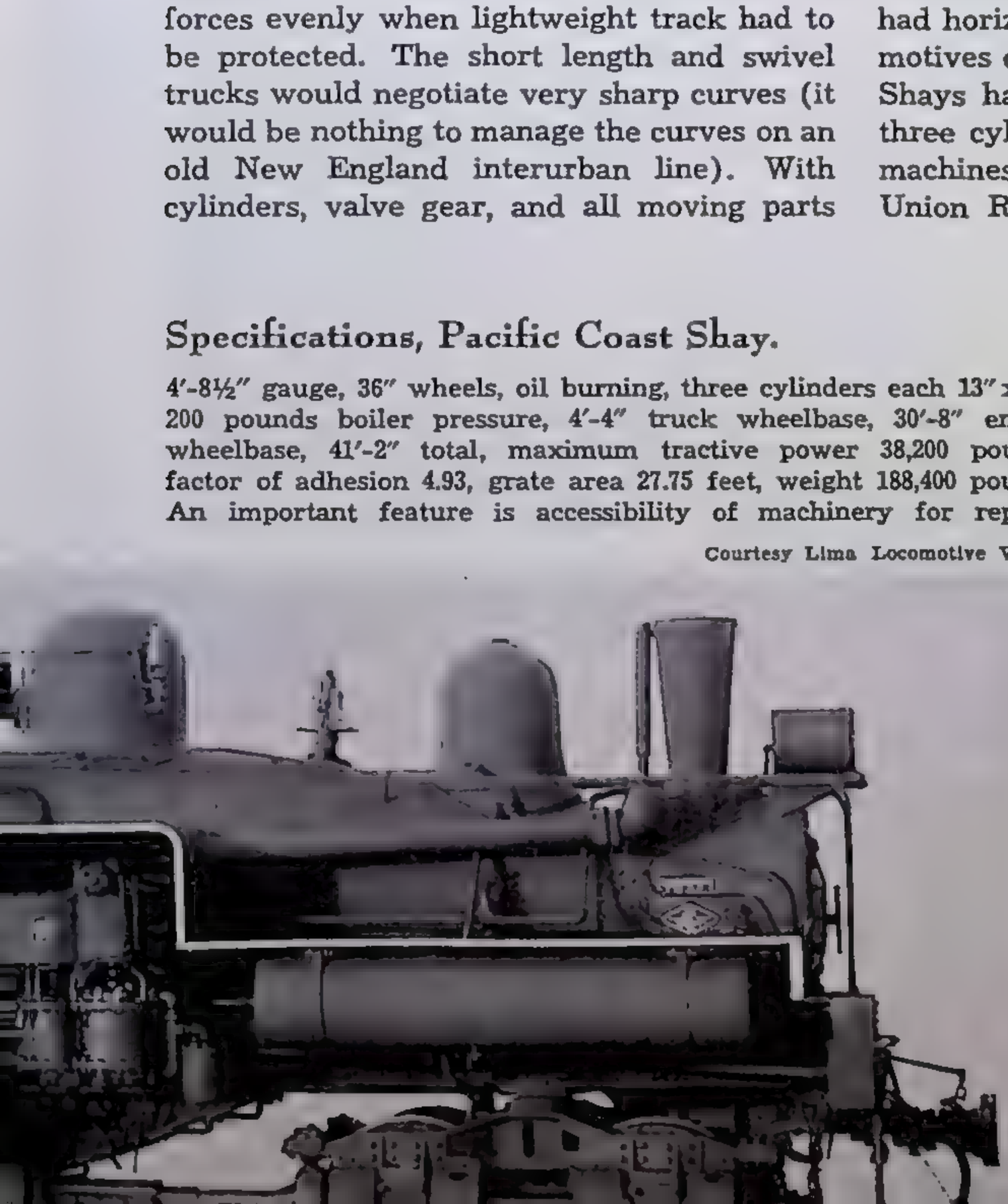
By 1884 the designs advanced to the use of three cylinders and a year later the first three-truck engine appeared. These engines had horizontal boilers like all "decent" locomotives of their day. In 1890, when over 100 Shays had been sold, the three trucks and three cylinders were combined on the same machines, the first being for the Montana Union Railway (see photograph, page 32). This engine replaced three-cylinder direct-coupled engines very successfully on the steep grades in the copper belt.

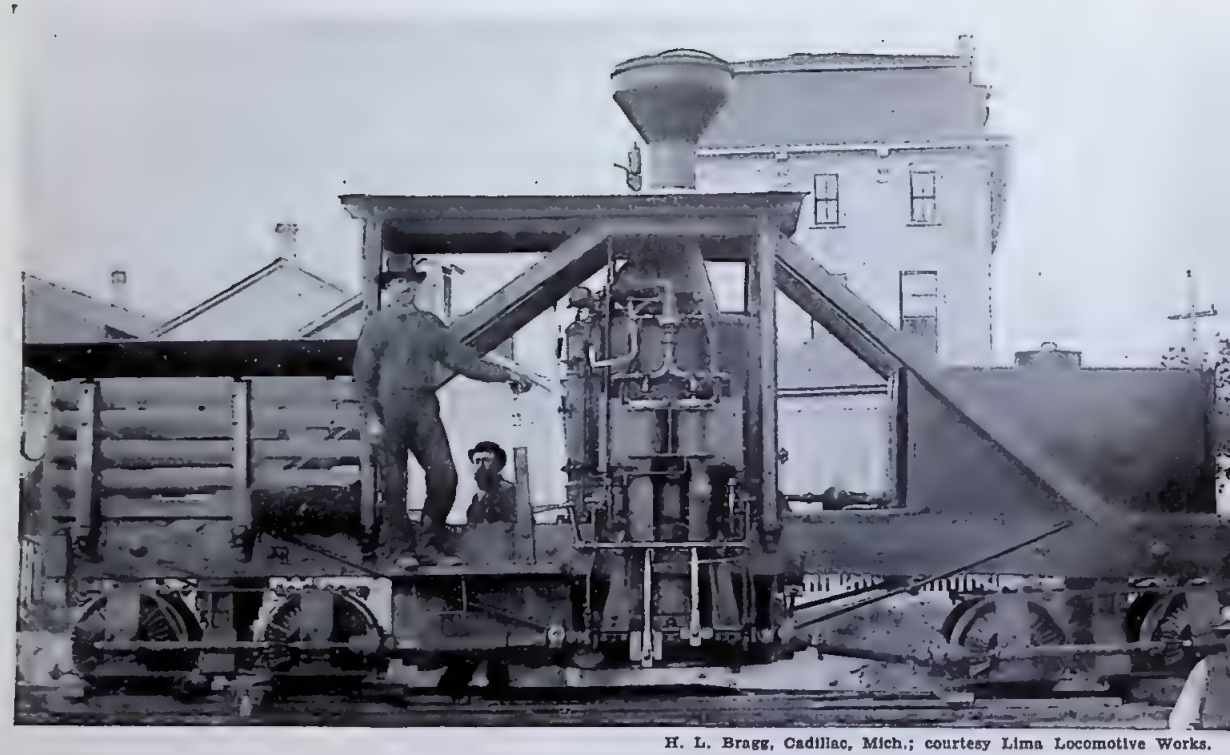
Not only had the lumber and mining industries made use of the Shay, but the engines were found in quarries, industrial plants, contractors' construction work, on plantations, and even on scenic railways and mountain sections of trunk line railroads. The 450th Shay was dolled up and sent to the great World's Fair at Chicago in 1893; 10 years later a four-truck job appeared with a tractive power of 53,000 pounds, equivalent to the pull developed by the

Specifications, Pacific Coast Shay.

4′-8½″ gauge, 36″ wheels, oil burning, three cylinders each 13″ x 15″, 200 pounds boiler pressure, 4′-4″ truck wheelbase, 30′-8″ engine wheelbase, 41′-2″ total, maximum tractive power 38,200 pounds, factor of adhesion 4.93, grate area 27.75 feet, weight 188,400 pounds. An important feature is accessibility of machinery for repairs.

Courtesy Lima Locomotive Works.





H. L. Bragg, Cadillac, Mich.; courtesy Lima Locomotive Works.

Lima's fifth Shay, 1880.

Lima's fifth locomotive was a Shay very much like the first; upright boiler, simple bridge truss frame, tank over one truck and fuel hopper over the other. This rare print shows No. 10 loaded on a flat car for re-use after it had been returned to Lima for wreck repairs in 1881. With two 8″ x 8″ cylinders and 24″ wheels, it was the success of little logging mules like this one that eventually made Lima one of the three great locomotive works of the country while other then-small companies lost business and failed.

much larger L-2s Mikados of the Pennsylvania Railroad, but of course not nearly so fast.

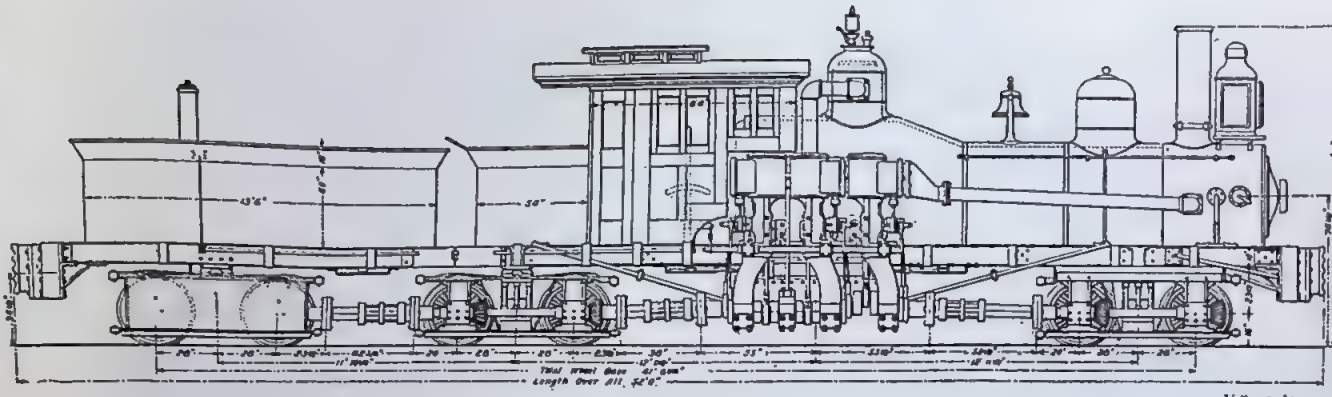
The most modern Shays have reverted to the three-truck design, perhaps because heavier second-hand rail has been much more available up to the time of the latest war scare. Power is also much more efficient, since it was the Lima Locomotive Works that made the greatest first steps in developing the use of feedwater heating (utilizing the heat of exhaust steam to temper cold water entering the boiler; try pouring a glass of cold water into a boiling kettle and you'll see what it prevents), superheaters (to heat steam from the boiler to well above the boiling point before entering the relatively cold cylinders), cast steel truck frames, heavy girder main frames, better gears, etc.

While the first Shay weighed 10 tons, the modern machine weighs more than 150, developing 30 times as much power. In the model called the "Pacific Coast" Shay, an oil burner, the frame design is ingeniously arranged to secure the cylinders independently of the boiler. Each cylinder and valve assembly is an independent engine interchangeable in part or as a whole with other assemblies. Exhaust and live steam lines have nicely rounded bends with low resistance joints. For cold weather cabs are completely enclosed, and the controls work in the same manner as in any other steam locomotive. A peculiarity of all Shay designs is that the boiler is not centered on the frame, but offset to the left. This is done to balance the weight of the cylinders on the right. The only feature still resembling the first locomotives is the flexible shaft arrangement. Each axle on the right side of the engine extends through the truck journals to a bevel gear of approximately 30 to 45 teeth. This is driven by a pinion bevel of around half as many teeth (but never exactly half, since it is not desirable to have

B. H. Ward, 745 Balboa, San Francisco, Calif.

These scenic railroads needed Shays to reach their summits.

The Argentine Central Railway climbed 16 miles of three-foot gauge track from Silver Plume, Colo. (elevation 8850 feet), to Mt. McClellan (14,007 feet). The company's little Shay engines (it had another kind of locomotive called the Climax type, with the main shaft between the wheels) each pulled three Colorado & Southern open coaches up nearly 8 per cent grades, around 125-foot radius curves, and over seven switchbacks. The line died of insufficient business to keep it properly maintained. Lower picture: The Mt. Tamalpias & Muir Woods line near San Francisco. No. 5 was the pet of the road; No. 4, beyond, shows the offset boiler. Summit house in distance is now replaced by a fire observation tower.



1/8" scale.

Drawing of an old Shay.

This three-trucker was built in the late nineties for the Buffalo & Susquehanna Railroad to do service on its steeper branches in the Alleghenies. Cab end view shows how boiler is offset to counterbalance the cylinder assembly. This engine burned bituminous coal, raising 140 pounds of steam to drive three 14½" x 12" cylinders. Drivers, 33"; wheel base, 41'-4"; total length, 52 feet. The log train shown on the opposite page is coming 'round the mountain in Western Canada. The scene is typical of territory in which Shays have been found most useful.

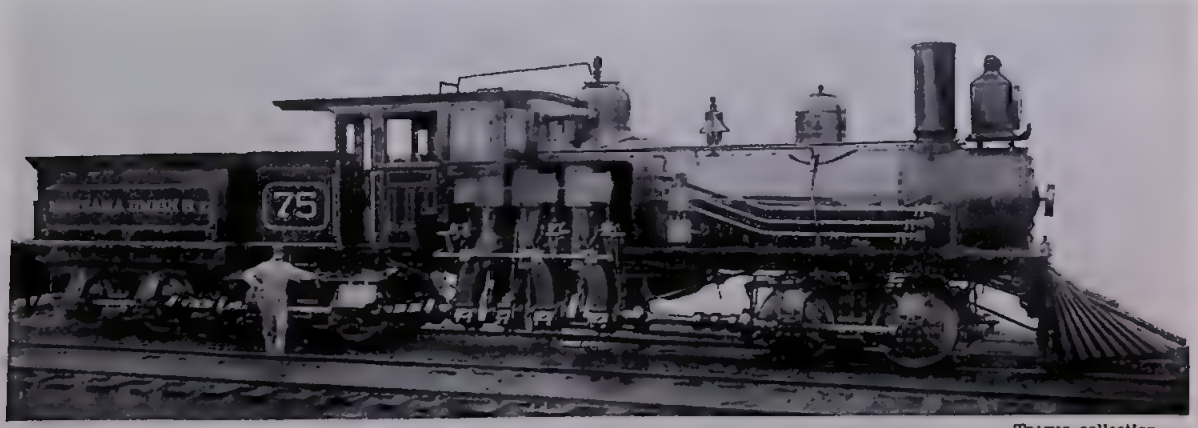
the same teeth mesh with each other on every revolution). The lengthwise shaft is rigid between the axles of each individual truck, but between trucks and the main crank shaft are two universal couplings to take up angular motion on curves, and a telescoping sleeve coupling that takes up necessary variations in shaft length when the truck sides swivel toward or away from each other.

Early Shays burned wood since it was so available in the logging business; now wood can still be used but boilers and fire boxes are also designed for oil or coal. Since the mechanical equipment is so flexible, Shays are built for all gauges of track and can even be converted from one size to another.

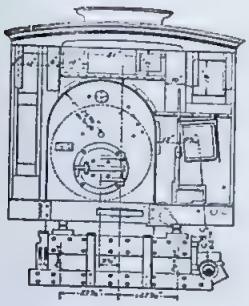
Today you'll find geared locomotives—Shays, Climaxes, Heislers, Baldwins, and so on—in the Pacific Northwest, in Upper Michigan, Wisconsin, Minnesota, Maine, and Canada. Some are doing big daily business, others stand in wasteland overcut by over ambitious lumber and pulp organizations, rusting beside a few sway-backed flat cars. In California Shays climb uncharted tracks in the Sierras; others await resale in the canyons along the coast. Old jobs which stood in a Portland (Ore.) junk yard last Summer are now probably being turned into battleships. When the ships become obsolete they might conceivably be ground into automobiles to be junked by the Sunday driver.

From the old Montana Union Railway.

This geared engine was very similar to the B&S engine in the drawing but not exactly like it. Cylinders were 16" x 15", drivers 40", wheel base 37'-10", weight 80 tons, gear ratio 18:37. Notice the cow catcher.



TRAINS collection.



Courtesy Lima Locomotive Works.

In the Blue Ridge, the Shenandoah, and Allegheny mountains geared mules work steep branch lines to the coal mines of the Eastern regions. New Shays are sold to prosperous firms in the lumber business and to steep pikes in the Andes of South America. The engines rusting in remote places are not old and worn out so much because they are Shays or because they have outlived their usefulness, but rather they stand idle because the timber is gone, and because of the greatly increased costs of running modern industries with their expensive labor problems and their excess profits, sales, property, and other mounting taxes.

Natural habitat—timberland.

The traveler to the Western mountain regions must leave the usual roads to find deer and bear; just so with the Shay, which lives in the deepest, most inaccessible regions that ever saw a streak of rust. This engine hauls timber in the Sierra Nevadas of California on unmapped trackage.

Erwin D. Joslyn, 2164 Castro Way, Sacramento, Calif.

W. R. McGee, 418 N. B St., Livingston, Mont.

Scene — 390 wheels rolling on Western iron.

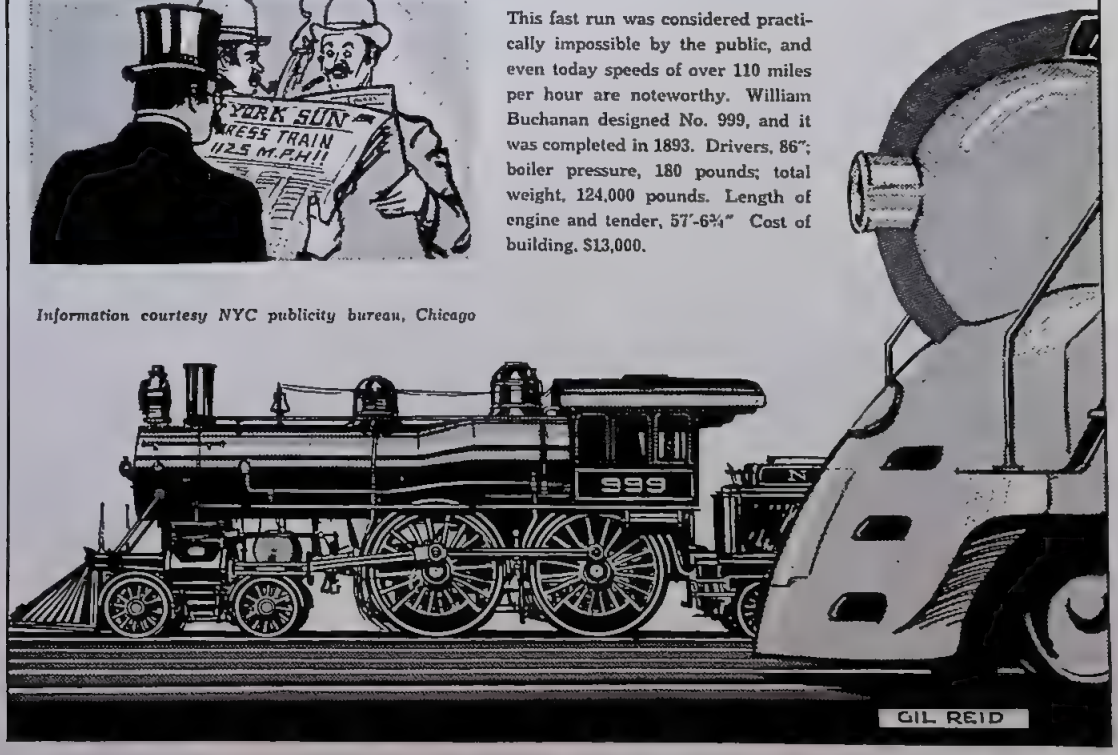
This is a Great Northern freight train—locomotive, 44 cars and caboose—about to enter one of the many tunnels on this twisted route in the Montana mountains between Butte and Helena. W. R. McGee, who took the picture, is a Northern Pacific freightman son of a hoghead, and the plane in which he was riding was at 6808 feet elevation, 800 feet above the track. The train is descending a 2.2 per cent grade on the eastern slope of the Continental Divide. Engine is a Class M-2 2-8-8-0 (Nos. 1965 to 1984) with 95,500 pounds tractive force. Notice, near the upper left corner of the picture, where the line has been altered to improve alinement.

Engine "999"

Crowning highlights during the railroad speed war of the late nineties and early twentieth century were the celebrated records achieved by the *Empire State Express* of the New York Central & Hudson River Railroad. It was the first train to better 100 miles an hour, and on May 10, 1893, reached a speed of 112.5 miles an hour on a slight down grade west of Batavia, N. Y. Most sources of information give engine "999" the credit for having made this speed. Despite stories to the contrary, the NYC swears that this is so, and it should know!

This fast run was considered practically impossible by the public, and even today speeds of over 110 miles per hour are noteworthy. William Buchanan designed No. 999, and it was completed in 1893. Drivers, 86"; boiler pressure, 180 pounds; total weight, 124,000 pounds. Length of engine and tender, 57'-6¾" Cost of building, $13,000.

Information courtesy NYC publicity bureau, Chicago



Freeman Blasingame, P. O. Box 178, Augusta, Ga.

Anderson's station is above the tracks.

Efficiently spanning the main line at Anderson, this station overcomes both the approach and taxable land area problems as well as being located right in the center of the city. Trains are below ground level, baggage and waiting facilities are located on the ground (second) level, and offices are at the top. Anderson is the largest town on the Blue Ridge Railway, and the BR is Anderson's most used railroad.

Blue Ridge Railway

★ With aspirations of a through line nipped by the Civil War, BR Ry. becomes traffic link.

By Ellsworth Knapp.

THE map of the Southern Railway System shows a medium black line shortcutting the main lines that join Charleston, S. C., and Atlanta, Ga. The shortcut is labeled "B. R." and one might pass it over as an unimportant and uninteresting branch of the Southern. But it is an independently operated, although wholly owned, subsidiary, the Blue Ridge Railroad.

Most important point served by the Blue Ridge is Anderson, S. C., a thriving cotton mill city of 19,424 population. Anderson appears early in the road's history, for in fact the project had its start in 1851 as a plan to build a railroad from Anderson west through Rabun Gap in the Blue Ridge Mountains between Georgia and North Carolina, and thence through the valley of the Little Tennessee River to Knoxville. In connection with then existing roads this would have provided a through route from Charleston on the coast to Knoxville. The projected Blue Ridge Railway route was to have run through Walhalla, S. C., Clayton, Ga., and Franklin, N. C.

But the Blue Ridge as part of the through route to Knoxville was not to be. This service is now provided by the Southern over a line farther north. However, the Blue Ridge remains as Anderson's most important railroad facility. Its conections with the Southern at Belton and Seneca afford good freight and passenger service, and two mixed and three passenger trains run each way over all or part of the 44.2 miles. The passenger schedule includes a somewhat inexplicable 2 o'clock in the morning run both ways between Belton and Seneca, at least inexplicable until one finds that it is a portion of the Southern Railway's through overnight sleeping car service between Atlanta, Ga., and Charleston, S. C.,

Morning train.

This is No. 1 behind Engine 3, crossing Broadway Creek Trestle, which was built before the Civil War. This train started at Anderson as No. 2 (Sunday schedule) and is now returning from Belton; it will run through to Walhalla, returning later in the afternoon as No. 4. In all there are nine daily trains on the railway with the runs arranged so that two locomotives could handle them all. Besides the passenger service, freight is operated with a mixed train.

Freeman Blasingame.

via Columbia, S. C., making use of the short-cut.

General offices are in Anderson, the office building being a two-story structure built right above the tracks at a grade separation. The same building serves as passenger station. The four locomotives are also housed at Anderson, in a square two-track engine house. The main line runs over rolling country with scenery as attractive as the name of the route suggests.

Other railroads into Anderson are the Piedmont & Northern, a branch off its main line at Belton, and the Charleston & Western Carolina, an Atlantic Coast Line affiliate. The Piedmont & Northern schedules no passenger service, and the Charleston & Western Carolina has a mixed train round trip daily. The Blue Ridge places the Southern in good competitive position for the considerable traffic of Anderson. Passenger business is comparatively small, as with most other branch lines, but the Blue Ridge handles much of the freight.

After the start of the project in 1851 construction work was pushed, some of it with slave labor, and by 1861 the Anderson-Walhalla line was opened for operation. A small

Top, F. E. Ardrey Jr., Aiken, S. C.; bottom, Theodore O. Gay, 624 78th St., Brooklyn, N. Y.

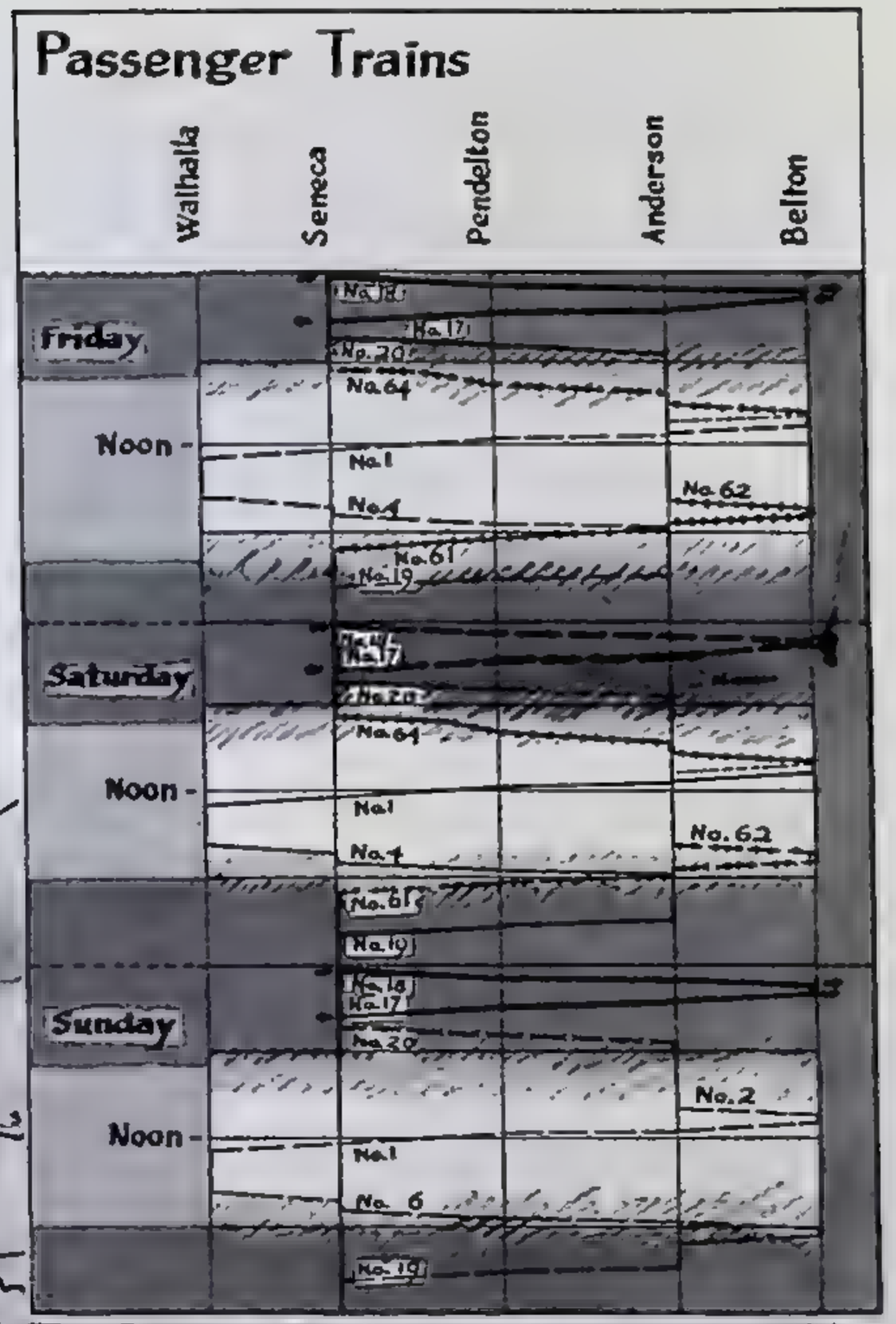
Blue Ridge Railway's four locomotives are all Ten-Wheelers.

The Ten-Wheeler (4-6-0) is a good general-purpose locomotive, and the Blue Ridge uses this type exclusively. Two were built originally for BR; the remaining two were formerly the property of the Georgia Southern & Florida, a portion of the Southern Railway System. The photos above are of No. 3.

amount of grading had been done west of Walhalla as a start on the line to Knoxville, but the War Between the States stopped work before rails had been laid and after the war came the trying reconstruction years and bankruptcies in 1871 and 1894. Finally the property was acquired by the Southern in 1901 through purchase of the capital stock.

Graphic timetable.

Passenger and mixed train (Nos. 61, 62, and 64) service on the Blue Ridge is shown in the graph, which covers three days and shows how two locomotives (solid lines and broken lines) could alternate to handle these trains.



Linn H. Westcott.

Blue Ridge Railway and vicinity.

The Blue Ridge Railway, shown heavy, forms the shortest path for the Southern Railway, medium, between Atlanta and Columbia. Heavy dots show once projected and partly graded route to Knoxville; other railroads shown in light lines, interurbans cross-tied. Seneca is on Southern's principal main line.

Service over the 10 miles between Walhalla and the Southern Railway at Seneca is only one round trip a day. This stub end of the old Knoxville project is not very important in the present-day traffic strategy of the Blue Ridge–Southern setup. But this stub end is interesting as the westernmost finished work on a typically ambitious project of the railroad-building years of the last century.

Beyond Walhalla signs of construction work can still be found. A few miles west is a tunnel which was started from both sides of the mountain and nearly finished before the war stopped work. Clemson College has leased the unfinished hole for experiments with the making of Roquefort cheese. From the tunnel mouth is a high fill, extending perhaps 300 feet and made of stone taken from the bore. Last year the road sold $1000 worth of this stone at 10 cents a ton and there is plenty there yet. The fills are practically complete all the way to Walhalla, but rails were never laid. Should the line ever be built through to Knoxville (and the local citizens of course talk of it) a new and better route would be used, around the mountain instead of through it.

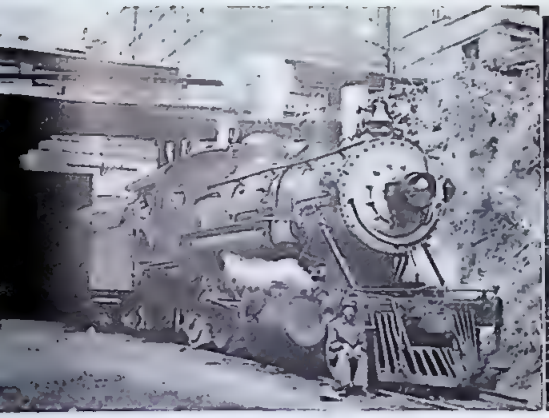
All photos by Freeman Blasingame.

THE Blue Ridge station at Anderson faces the business street where the tracks pass below. This convenient arrangement avoids traffic tangles. Railroad offices upstairs.

Backing farther, one approaches the engine terminal, passing a water tank located on the main line. Scene of preceding photo can still be seen in the extreme distance.

Broadway Trestle, four miles east of Anderson, is 80 feet high and was built before the Civil War. State of preservation is unusually good for its age.

Detail showing how the bents of the trestle were made to span a creek at the bottom of Broadway Ravine. Much of the masonry on the Blue Ridge line was built by slave labor.



Below ground level are two tracks with a platform and stairs between. Engine is No. 3 ready to pull Sunday morning train to Belton, S. C.

Backing up along the main line, downtown Anderson in distance. Grade crossing elimination keeps this railroad from having a dinky appearance so common on short line facilities.

The Blue Ridge Railway engine terminal is a brick building with two stalls. A handful of engines, some ex-Southern, stand ready for use.

This bridge crosses a main highway west of Anderson. The country is rolling and it is out of the ordinary that the railroad has a section of track four miles long without a curve.

On the never-finished roadbed reaching toward Knoxville is Stump House Mountain Tunnel, longest of thirteen. Stopped by the Civil War.

With slave-built piers, this steel bridge is one of the largest structures on the line. It spans Six and Twenty Creek, about six miles west of Anderson. Construction started about 1855.

Lucius Beebe.

Pennsylvania's "The Jeffersonian"

★ New fast coach train between St. Louis and the East follows success of *Trail Blazer.*

THE *Jeffersonian,* a fast all-coach train of the same type as the New York-Chicago *Trail Blazer,* is now running on the Pennsylvania between St. Louis and New York. The over all running time is 20¼ hours.

Two more K-4's were streamlined for this service. The bullet fronts, with gold and red keystone number plates, are similar to the 6100, the 6-4-4-6 locomotive which was displayed at the New York World's Fair, but in other respects the streamlining of the *Jeffersonian* engines is a distinct departure. The lines of the cabs are entirely new, with front sheets and side and rear windows inclined downward and to the rear. The stack and domes are completely concealed in a monitor which is carried the length of the engine.

Chromium plate and gold striping are boldly used to afford relief and to accent the sweeping contours. Cylinder and valve chamber heads glisten, and chromium plate is also used on the hand rails along the sides of the boiler. Two wide gold bands, one at the level of the cab window top and the other at running board height, stretch the length of locomotive and tender, with four narrower stripes beneath. Lettering is also in gold, and the basic finish is dark green-black. These two K-4's, 5338 and 3579, are similar to the two streamlined last Winter for the *South Wind.*

Hiawathas at New Lisbon

★ When four steam-powered streamliners meet at a single point there's bound to be real activity.

By John F. Boose.

PICTURE a lazy Summer afternoon in the "driftless area" of western Wisconsin: temperature high, humidity high, big bulbous clouds barely moving in an almost breezeless pale blue sky. In this scene, on nearly level ground, is New Lisbon. It is on the main line of the Milwaukee Road, Chicago 221 miles, Mineapolis 200 miles, elevation 894 feet above sea level.

Illustrated by Linn H. Westcott.

New Lisbon depot is a sturdy stucco covered structure on the north side of the 132-pound rails; eastward from the bay window one looks beyond the platform sheds down a long straight roadbed toward Mauston, seven miles. Just past the first grade crossing, tended by a jovial man wearing dark glasses and a safety belt studded with red reflectors, is a large coaling stage on the north side of the tracks. While not seen from the window, north of the fuel tower is the wye connecting the main line to the Wisconsin Valley Branch. A two-stall engine house sits in the center of the delta-shaped enclosure. Walk out onto the main platform and look west. There, too, is a long tangent, but the main makes a slight bend to the south through the station grounds.

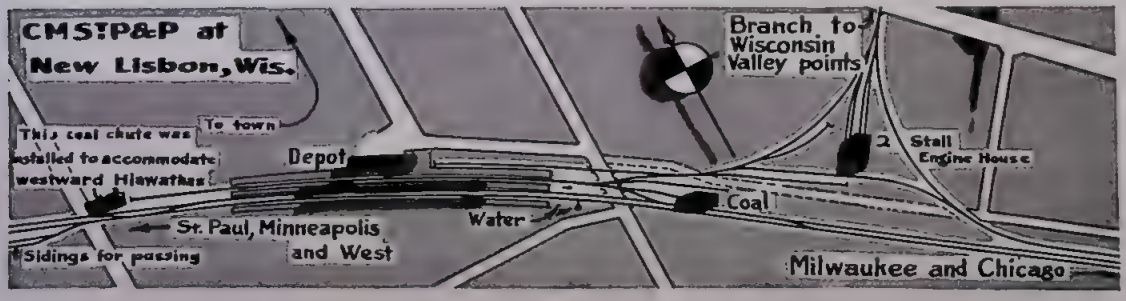
It's now 3:05 p. m. Extra 373 West has just arrived with 107 cars of freight. A few minutes before it was pounding through the scrub forests near Wisconsin Dells at 35 per; now the engine, Class L-3, U. S. R. A. heavy Mikado, has pulled ahead for coal, again for water, and is about to put the cars into the siding west of the depot to make way for the *Hiawathas.*

Smoke down the main to the west heralds the approach of Extra 220 East, 127 cars double-headed with one L-3 and No. 220, one of the new S-2 engines, 4-8-4, fast and powerful. This freight has just enough time to fuel and water and get into the hole by 3:35, when the *North Woods Hiawatha,* train No. 200, whistles for the U. S. 16 highway crossing just north of the wye.

That whistle, a piercing air horn to be exact, marks the beginning of railroad activity hard

Layout of New Lisbon facilities.

Here is a bird's-eye view of the Milwaukee Road tracks at New Lisbon. The U. S. Highway 16 crossing mentioned in the text is the diagonal broad white line in the upper right corner of the sketch.



From Wisconsin Valley.

Engine 10 pulling train 200 after a stop at the wye switch north of the engine house; conductor, after throwing switch, will follow brakeman on foot to depot. Above, twin loco No. 11 waits in the engine house for Summer activities to begin.

to match anywhere, let alone in a rural town of 1000 citizens. At 3:45 the *North Woods* backs into the stub track north of the mains and passengers pile out, cross over to the south platform to take the eastbound *Afternoon Hiawatha,* No. 100, for Milwaukee and Chicago at 4:01. But in the meantime No. 58, a 10-car local mail, baggage, and express train with one coach, pulls into the station, does its station work and backs into a siding ready to continue eastward at 4:10.

If you've followed the movements this far you'll find 58 and extras 373 West and 220 East in the hole west of the depot. No. 200 has arrived from the north and is now standing nose east at the station ready to become 201 for its return journey. A crew of men is busy checking engine 10, the streamlined Ten-Wheeler that is used on the North Woods branch because the track just isn't built for larger streamliners. Most no-

New Lisbon station activity.

Here is a $116 express shipment, a stone monument for a northern Wisconsin city, going into the baggage car of the *North Woods Hiawatha.* No. 10 has just been greased, waits connections.

The beaver tail of *Hiawatha* 100 glides out of the station. Wye for turning North Woods trains is to the left. Coaling plant in center has been supplemented by another west of the depot.

New Lisbon at 3:48.
Engine 10 has left its train on the right, pulled ahead for greasing and a check-up. In the distance engine 220 from an extra freight gets refueled before taking siding; 58 is already in the clear.

Important duty.
Important but rarely noticed railway employees handle an Alemite gun operated with air from the locomotive to lubricate side rods of the Ten-Wheeler.

Waiting passengers.
While engines are groomed nuns, business men, resorters, and tourists from train 200 wait on the south platform for 100. In Summer the North Woods trains usually run clear through to Chicago.

ticeable work going on about the engine is the use of a large Alemite gun to lubricate the side rods and valve motion. No. 10 is a very unusual engine; while we wait for the next *Hiawatha* I'll tell you about it.

Back in 1899 Baldwin started building a series of Vauclain Compounds, with two high- and two low-pressure cylinders, for the Chicago, Milwaukee & St. Paul. Most of them were delivered late the next year, numbered 300 to 325, Class B-3. No. 315 was to become our present No. 10 and 306 the sister streamliner, No. 11. They did the work well, were renumbered 1615 and 1606 in 1906, 4225 and 4206 in 1913, and when the compound working was no longer desirable the engines were rebuilt as Class G-6ps, Nos. 2769 and 2765, which numbers they kept until 1936 and 1938, when the two middle-aged Ten-Wheelers were taken to the locomotive fountain of youth, emerging streamlined as Nos. 10 and 11. They at present resemble the first *Hiawatha* locomotives, 1, 2, 3, and 4, but the boilers are shorter.

By golly, that eastward *Afternoon Hiawatha* sneaked into the station so quietly we didn't

The same scene a moment later. Train 101 approaches headed by one of the F-7 4-6-4 locomotives. The signal has not yet cleared behind train 100; Ten-Wheeler No. 10 is backing onto 201.

Passengers from Chicago step down from *Hiawatha* 101, at left, and many cross the platform to the *North Woods Hiawatha*, train 201 at right. The *North Woods* serves Wisconsin Rapids, Wausau, Tomahawk, Minocqua, and makes many intermediate stops.

even hear it. The Alemite gun is already doing its chugging and the water crane has been swung over the tender. No. 100 was pulled from the Twin Cities, 200 miles, in 3½ hours, including the half hour between Minneapolis and St. Paul Union Station, and three intermediate stops. On the head end is No. 3, one of the famous 4-4-2 locomotives built for high speed service. This engine is Class A, and differs from the usual Atlantic in that the main rod connects the pistons to the crank on the first pair of drivers rather than the second. This was done to keep the rods in line, impossible with the conventional hook-up.

Passengers steadily file into the yellow and red coaches, kept cool by the machinery hidden in long channels under the cars. In about four minutes the engine is greased and watered. The exhaust barks as the train smoothly approaches the grade crossing, and by the time the beavertail lounge car passes it is going at a good clip. Before the block signal rises to its 45-degree caution position No. 101, westbound *Hiawatha,* appears over the rise near Mauston. In the meantime express men have been loading a huge granite memorial stone into the baggage car of the *North Woods,* express charge $116 Chicago to Wausau!

No. 101 is headed by an F-7, Milwaukee Road's newest class of passenger locomotive. This is streamlined and painted differently from the A and G classes and is fast becoming a favorite on the system. As 101 pulls out to the west, 58 will move out of the siding to the station platforms, and the *North Woods Hiawatha,* now train No. 201, will start around the wye for points north.

Last Summer there was so much traffic that the cars from the *North Woods* were pulled to Chicago ahead of the regular *Hiawatha* by the locomotive from 58. That sort

Train 201 makes a quick start.

Local No. 58 is about to start for Milwaukee and Chicago, vainly chasing the eastbound *Afternoon Hiawatha,* when the little streamlined Ten-Wheeler pulls the *North Woods* smartly away from New Lisbon.

North, south, east or west. Beavertailed train 101 goes west, train 201 on the right serves northern points, while No. 58, approaching the station, will take you south and east. Take your pick.

of leaves 58 stranded in the siding with no engine for a while, but the situation is relieved by turning the engine which brings the *North Woods* cars from Chicago and using it for 58. This double play with motive power gives just the extra minutes needed for servicing both engines.

After No. 10 leaves with train 201 for the North, the two extra freights pull out and the watchman finally sits down in his chair and leans back against the shanty—a much welcomed rest after nearly an hour of hopping up and down with the stop disk. Except for freight movements, the next train is at 1:53 a. m.

Most of this activity can be seen without more of a stop than that made by eastbound Minneapolis-Chicago train No. 58, so on your next ride over the Milwaukee between these cities leave Minneapolis two hours early, take 58 instead of the *Afternoon Hiawatha*, hop off at New Lisbon and take in the three-ring motive power sideshow. No. 58 does not carry a diner, so unless you plan to eat instead of watch trains during the half-hour stop at New Lisbon, you had better make other arrangements.

Should you be driving through central Wisconsin on a vacation, the territory near New Lisbon offers other railroad attractions in addition to fine scenery. Elroy, about 18 miles south-southwest, is a junction on the Chicago & North Western's main line between Chicago and the Twin Cities via Madison. About the same distance northwest is Wyeville on the same road's main line via Milwaukee. Over this last trackage runs the "*400*." Through this area and a little to the west are dozens of photogenic settings for railroad pictures. Don't overlook the excellent possibilities for speed shots of the main line *Hiawathas* east or west of New Lisbon, or of the *North Woods* train north of the city.

That last mentioned Summer run, the *North Woods* from Chicago, is worthy of note: Time tables show it running on the regular *Hiawatha* time; actually it starts a few minutes early (if you miss it you have to take 101 to New Lisbon). The run is a fast one, making New Lisbon as much as 20 minutes early, in time to turn the train on the wye, change engines, and load any waiting passengers before the regular train arrives. The plans for this year's Summer service have not been completed but it will be interesting to see how the heavy traffic is handled. Probably the same "now you see it, now you don't" hocus-pocus will be used with the engines.

Letters

★ A Traveler's dilemma; bouquet for writer; 0-4-4-0 Mallet.

A Traveler's Dilemma.

THE intriguing Spanish names which have been sprinkled so generously on unassuming little cities in California are always a source of good-humored confusion to tourists passing through the Golden State. The story is told of the Eastern railfan who couldn't pronounce Castilian appellations:

Pulling into San Jose, he was taken aback to hear the conductor call out "San Hoe-*zay*"; crossing the San Joaquin near Stockton, he drew back dazedly at the sound of the brains announcing "San Waw-*keen* River"; and at Vallejo he passed a half hour between trains trying to say an uncomfortable "Val-*yay*-hoe."

But the pay-off came when the train pulled up at a little depot in the Sacramento delta. The traveler craned his neck out of the window, his heart beating wildly. Here, at last, was a name he could pronounce. In a voice of triumph he turned to a fellow passenger. "This is Fairfield we're coming into." The words and the smile died from his lips as the conductor opened the vestibule door, leaned against it lazily, and called out: "Soo-*soon*!"

The railfan blanched, slumped down in his seat, and lapsed into a stunned silence for the duration of the trip.

As the train disappeared into the distance, a pastoral quiet descended upon the station and on the two little towns which nestled on either side of it—Suisun and Fairfield.

Roy E. Covert.

2217 Oregon St., Berkeley, Calif.

Bouquet for Moedinger.

A BIG bouquet for William Moedinger Jr. for his article "Railroad Vacations" in the May issue. If anything, he made an understatement when he said railroads offer "by far the best look at our United States."

The $90 grand circle tour is the travel value of all time. I have taken the trip twice since the low fare was first offered three years ago. In 1939 I traveled the central and northern routes. Last month I did a repeat, going by the central and returning over the Sunset line. Here are some impressions:

Fastest riding: Milwaukee Road *Hiawatha*; B&O *Columbian*.

Leisurely riding: Southern Railway.

Best train: Espee *Daylight*.

Striking scenery: D&RGW; Southern Pacific Shasta line.

Most "professionally operated" road: New York Central.

Biggest gripe: The way standard steam limiteds were sidetracked to let those newfangled, giddy Diesels go by.

Mack Talbot.

316 Stegman Pkwy., Jersey City, N. J.

0-4-4-0 Mallet.

ENCLOSED is a works photograph of an 0-4-4-0 Mallet built in 1927 by the German firm of Orenstein & Koppel, which has flooded this island with industrial locomotives. There are many of this type here and I am watching the rebuilding of one of them from parts of three abandoned ones in the company's Surabaya shop. Neither the government engineer now in charge nor I can figure out this valve gear, although we have the drawings and have had the actual parts in our hands. You will notice that the front unit has inside frames but the rear one has outside frames, allowing more space for the fire box and ash pan.

Courtland Christiani.

American Consulate, Surabaya, Java.

Mallet of German make.

Built in 1927 for use in Java, this 70-centimeter gauge 0-4-4-0 locomotive utilizes sugar cane stalks as fuel.

New Railroad Books

NICHOLS STANDARD RAILROAD TEXTBOOK, by Clarence E. Nichols. 402 pages, 9" x 12". Published by Railroad Textbook Co., Portland, Ore.

TEXTBOOK is hardly the word for this work. It is a compilation of a vast amount of material about railroads, not all of it related and not too legibly printed. It is at its best as a reference work, especially in regard to operating rules, locomotive inspection rules, and air brake maintainence. Included also are chapters on the history of several railroads. Best in the book is the section on operating rules, especially designed to help railroad trainmen pass examinations.

FARES, PLEASE!, by John Anderson Miller. 196 pages, 6" x 9", $3.50. Published by D. Appleton-Century Co., New York, N. Y.

FARES, PLEASE! is an excellent illustrated history of urban transportation from the days of the first horse-drawn omnibus (Paris, 1819) to the streamlined P. C. C. street cars of today. The work is well written and interesting. While not exactly a railroad subject it is just the thing for trolley fans, an engaging bit of Americana for anyone's library.

YOU MEN

Who Travel to

MILWAUKEE

HERE'S YOUR BEST LOCATION

In the very center of the business and entertainment districts, The Wisconsin offers 450 "hospitality units"—rooms of superior comfort, plus a genuinely friendly atmosphere. Coffee Shop and Cocktail Lounge. Garage and parking lot.

LEWIS S. THOMAS, MGR.

WITH BATH from $2.50 without bath $1.50

HOTEL WISCONSIN

Owner operated by the Milwaukee Hotel Wisconsin Co.

AMERICA IS YOURS

See the United States spread out before you

"OHMAN'S New Relief Map of the United States" is the only "Three-Dimension Relief Map" of this character on a flat surface and is the most outstanding contribution to the science of map-making. It is a lithograpic reproduction of the original, hand-modeled Relief Map.

Mountains and valleys, together with land altitude above sea level, are portrayed in beautiful colors, and are clearly seen at a glance as they exist on the face of the earth.

Due to its richness of fine detail in geographical, topographical and commercial accuracy, the Ohman Relief Map is accepted for Academic and Professional reference. It forms an invaluable standard supplement to all maps. Such an unusual panoramic picture cannot even be visualized from present made maps.

Railroads

All important railroad routes are easily followed on this map, and the three-dimensional relief makes it easy to see what determined the routeing, how mountains are crossed and river valleys followed. It's almost as much fun to follow your favorite trains on this map as it is to actually ride them!

Map is 36" x 23," scale 1" to 85 miles. Key to the map is on reverse side, and each copy is complete with metal strips ready for hanging.
Postpaid $3.50

The Ohman Co.
Makers of Fine Maps
MEMPHIS TENNESSEE

The Month

★ Senate and I.C.C. clash over narrow gauge abandonment.

★ The Interstate Commerce Commission ordered abandonment of the D&RGW's 125.3-mile narrow gauge line from Antonito, Colo., south to Santa Fe, N. M., on January 22, but has postponed the order several times to allow completion of a Senatorial investigation. Now a Senate committee, for the first time in memory, tells the I. C. C. what to do and why, and asserts flatly that the line should not be abandoned; that it should be converted to standard gauge and built up as a short line connection between southern Colorado and the Southwest. Among sensational charges made by the committee are the assertions that the DR&GW has discouraged interchange traffic via the Santa Fe Railway, and that rates and service on the narrow gauge lines have been deliberately manipulated to discourage traffic and bring about conditions favorable to abandonment. These charges sound like political ammunition, and it will be interesting to see what the I. C. C. does about them.

★ Steam locomotive orders included 20 4-6-6-4 *Challenger* type articulated locomotives for Union Pacific and 15 additional 4-8-2 Mohawk locomotives for New York Central. Both these orders went to American Locomotive.

★ *Railway Age* uncovered the fact that a single airport, the one in New York City, cost more than all the airliners used in commercial transport, 48 million dollars as compared with 40 million dollars for the 355 planes used. The taxpayers paid for this airport and for the hundreds of other airports the country over, while railroads pay for their own terminal facilities, likewise a large part of their investment. And we have always thought of the airways as a privately capitalized competitor of the railways!

★ The Pennsylvania Railroad proposes to buy control of the Wabash, and the New York Central opposes such control because the Pennsy would then be of such size as to overshadow all other railroad systems in Eastern territory. The matter is before the I. C. C.

★ New Haven has ordered five Diesel-electric road locomotives which will be suitable for dual service, either freight or passenger.

★ Send notices of fan trips before the first of the month preceding date of issue or they cannot be included in TRAINS.

Fan Trips: July 13, from Milwaukee to Oconomowoc over Milwaukee Electric Lines. Central Electric Railfans' Association, 1240 Edison Building, Chicago.

July 27, from Los Angeles Union Terminal, 8 a. m., over Southern Pacific and Ventura County Railway to Port Hueneme and Ojai, return via Moorpark and Santa Susana. Fare, $2.85. Railroad Boosters, 518 Pacific Electric Building, Los Angeles.

July 27, from Grand Central Terminal, New York City, over the entire Harlem Division of NYC, a portion of the Boston & Albany, tentatively through the Hoosac Tunnel and over Hoosac Tunnel & Wilmington Railroad. Fare, approximately $3.60 for 414 miles. Reservations must be made to Edward A. Hansen, New York Division, Railroad Enthusiasts, Box 63, Packanack Lake, N. J.

★ The *Peppersass* locomotive referred to in the Mount Washington Cog Railway story, page 29, June TRAINS, as "a likeness built for publicity purposes," is actually the original first loco of the road and will shortly be returned to its place of honor in the base station of the railroad.

★ Unusual abandonment news was the I. C. C. authorization for abandonment of the 19.9-mile Raleigh & Charleston, subject to the condition that it be continued if a buyer be found who will pay not less than the net salvage value.

★ Because the Soo Locks might be bombed in wartime, shutting off ship-born iron ore traffic between Lake Superior and the lower lakes, the R. F. C. has been given power to finance a railroad, presumably the double tracking and improvement of an existing single-track line from the iron country to the head of Lake Michigan. In emergency such a line could bypass the locks. Normally the larger investment would not be justified; hence the authority for government financing as a defense measure. This should put the quietus on talk of waterways projects as "defense necessities."

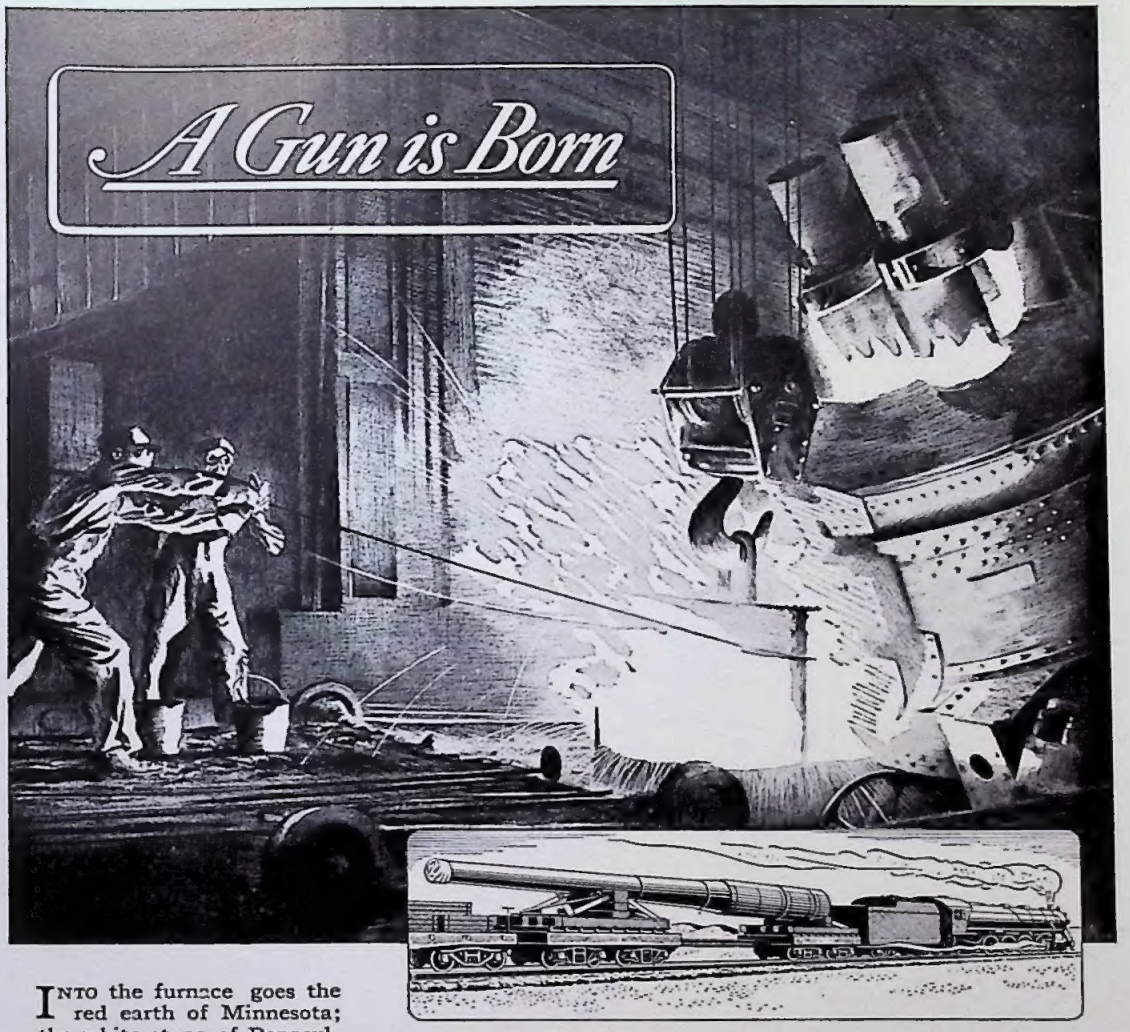
★ *Back Cover*: The *Eagle*, St. Louis-Kansas City streamliner of the Missouri Pacific, passes Valley Park, 18 miles west of St. Louis, while agent B. R. Neel jots down the passing time on his train sheet. This striking photographic study was made by W. E. Chase, a Missouri Pacific foreign lines clerk.

Narrow gauge to Santa Fe.

Antonito, Colo., junction point on the narrow gauge and mixed gauge lines of the D&RGW and north end of the controversial (over abandonment) 36" gauge to Santa Fe, N. M.

William Moedinger Jr., 23 E. Vine St., Lancaster, Pa.

A Gun is Born



INTO the furnace goes the red earth of Minnesota; the white stone of Pennsylvania; the black rock of West Virginia. Out of it emerges another grim guardian of our cherished liberty. Meanwhile the instruments that will control its fire are being fashioned in Brooklyn, from metals alloyed in Connecticut of Arizona copper, Oklahoma zinc and aluminum made in Tennessee from Arkansas bauxite.

When you start tracing back the elements that go to make up our armor of defense, you find the trail divides again and again. It will lead you back to every state—yes, almost to every county. Each makes its contribution. Each does the thing it does best.

And bringing all these elements together – weaving them into a coordinated program of defense – you'll find the railroads – the only form of transportation that can do this job.

The railroads – moving goods so economically that bulky ores can be shipped half way across the continent for refining. Operating so swiftly, so dependably that it is now common manufacturing practice to fabricate parts in widely separated plants and bring them together *by rail* at a common final assembly line.

IT MUST MOVE BY RAIL

Latest estimates are that the steel industry will produce more than 87,500,000 tons of steel in 1941. To make this much the mills will need

2,430,000 carloads of iron ore
650,000 carloads of limestone
1,725,000 carloads of coke
450,000 carloads of manganese, chromite and other special ores and miscellaneous materials.

And after all these materials have been converted into steel, the railroads will handle it all again, perhaps several times, in various stages of manufacture—a job that only railroads could do. The steel business couldn't get along without the railroads any longer than the railroads could get along without steel.

BIG TRAVEL BARGAIN—$90 coach fare, $135 Pullman ($45 extra for one or two passengers in a lower berth) for Grand Circle Tours of U. S. Ask your local ticket agent.

ASSOCIATION OF AMERICAN RAILROADS WASHINGTON, D. C.

Trains

See page 50.

W. E. Chase, courtesy Missouri Pacific.